[illegible] PROCESSING SERVICES MARKETS

1989 - 1994

INPUT

About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, systems/software maintenance and support).

Many of INPUT's professional staff members have more than 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

INPUT OFFICES

North America

Headquarters
1280 Villa Street
Mountain View, CA 94041-1194
(415) 961-3300
Telex 171407 Fax (415) 961-3966

New York
959 Route 46 East, Suite 201
Parsippany, NJ 07054
(201) 299-6999
Telex 134630 Fax (201) 263-8341

Washington, D.C.
1953 Gallows Road, Suite 560
Vienna, VA 22182
(703) 847-6870 Fax (703) 847-6872

International

Europe
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
(071) 493-9335
Fax (071) 629-0179

Paris
52, boulevard de Sébastopol
75003 Paris, France
(33-1) 42 77 42 77 Fax (33-1) 42 77 85 82

Tokyo
Saida Building
4-6, Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101, Japan
(03) 864-0531 Fax (03) 864-4114

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U.S. PROCESSING SERVICES MARKETS, 1989-1994

INPUT®

1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

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U.S. Processing Services Markets, 1989-1994

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Abstract

This INPUT report, *U.S. Processing Services Markets, 1989-1994*, provides forecasts and analysis for the transaction processing, utility processing, other processing, and systems operations (facilities management) categories.

The five-year forecasts cover fifteen industry-specific and seven cross-industry markets. Leading vendors are profiled in the report.

The report discusses issues and trends and provides recommendations on how vendors can take advantage of the key forces driving the market.

The report contains 176 pages and 36 exhibits.

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I

Introduction

I

Introduction

A

Purpose and Scope

This report covers the processing services segment of the information services industry, for the period 1989-1994. Included in this report are descriptions of the issues, trends, and events affecting these markets, a detailed five-year forecast of the markets and their subsets, a description of the forces that drive or inhibit the markets, a discussion of leading vendors, their activities, and market shares, and opportunities and recommendations for vendors.

The report provides readers with information and insights that will allow them to:

- Review the forces that are shaping the market
- Identify new markets and possible product opportunities
- Assess the penetration of competitors
- Determine potential market directions
- Assist in prioritizing investment dollars

The report covers: transaction services, utility services, other processing services, and systems operations (facilities management) with vendor-owned equipment. Network services such as value-added networks (LANs), electronic data interchange and electronic information services (on-line data bases) are covered in a separate report.

B

Market Structure

Exhibit I-1 defines the scope of the information services industry that is tracked and analyzed by INPUT.

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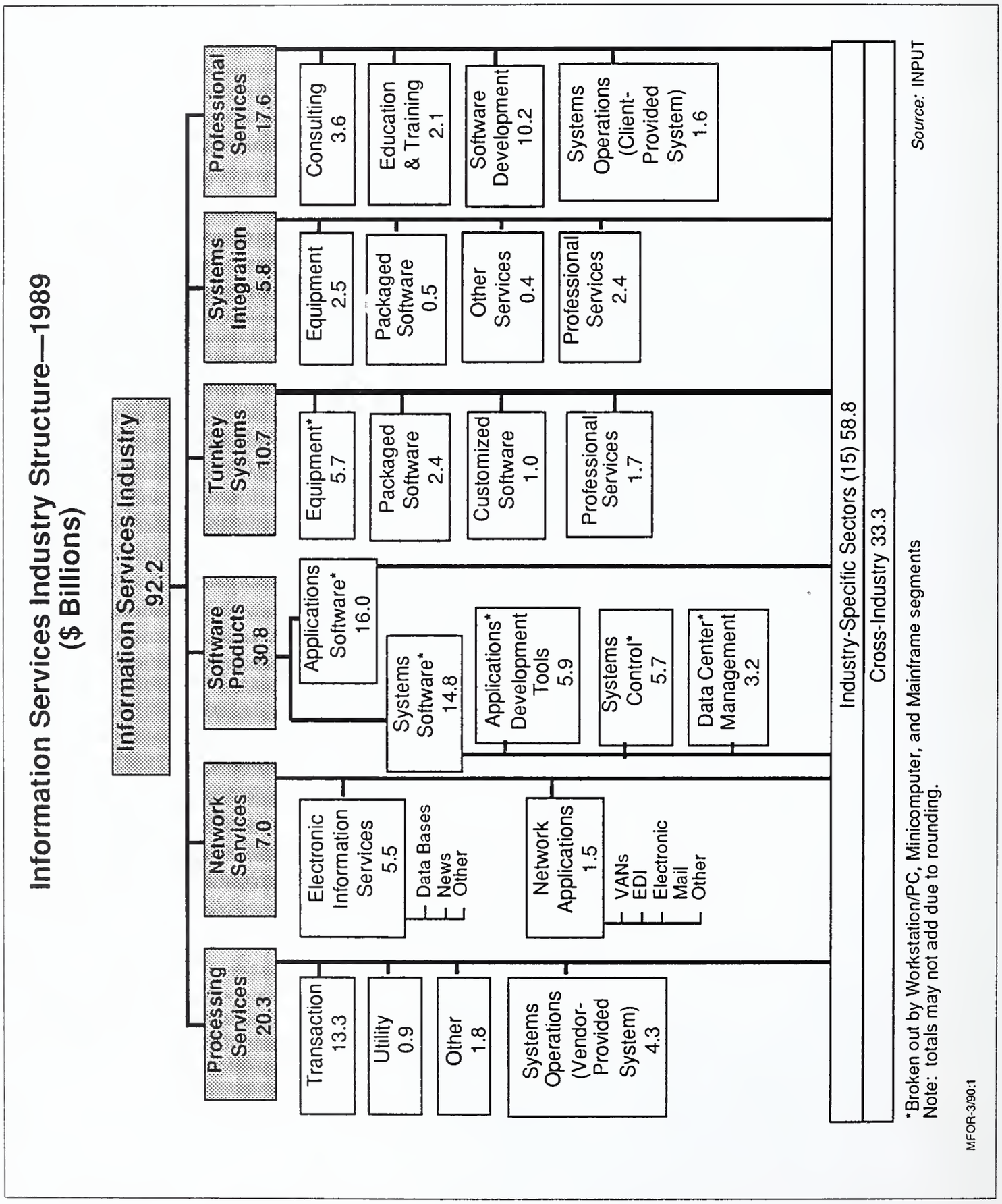
EXHIBIT I-1



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Utility processing is the use of vendors' computers for a wide variety of processes that enable users to solve computational problems and develop and run computer programs of their own.

"Other" processing services are a collection of specialized services not closely related, but categorized together for convenience. These include computer output microfilm, disaster recovery and backup, scanning, data entry, and laser printing services.

Systems operations has been referred to in prior INPUT reports as facilities management. Specifically, this reference is to systems operations where the vendor provides the computer systems necessary for the operation. In cases where the client provides the computer systems that are so employed, INPUT identifies those revenues as part of the professional services market.

C

Research Methodology

INPUT methodology for data collection, analysis, and forecasting is depicted in Exhibit I-2. During the first half of 1989, INPUT conducted in-depth interviews with 500 information services vendors, including nearly all the 250 largest firms. The smallest of this group of 250 vendors had about $22 million in revenues in 1988.

Revenues of the smaller 250 companies ranged from $250,000 to $22 million. Collectively, revenues from all 500 firms represented 65% of total information services industry revenues.

Companies that are not exclusively involved in information services are identified as follows:

- If a division or a subsidiary that markets all information services for a company is generally known by its own name, then it is identified by that name rather than the parent company's name. One example is Boeing Computer Services Company, a division of aircraft manufacturer, the Boeing Company.

- If more than one division or subsidiary markets information services, the information is included in and identified by the parent organization's name. An example is Control Data Corporation.

- Organizations are reported according to their legal status as of December 1988.

Companies have been classified according to the delivery mode of service from which they derive the largest proportion of their U.S., noncaptive information services revenues.

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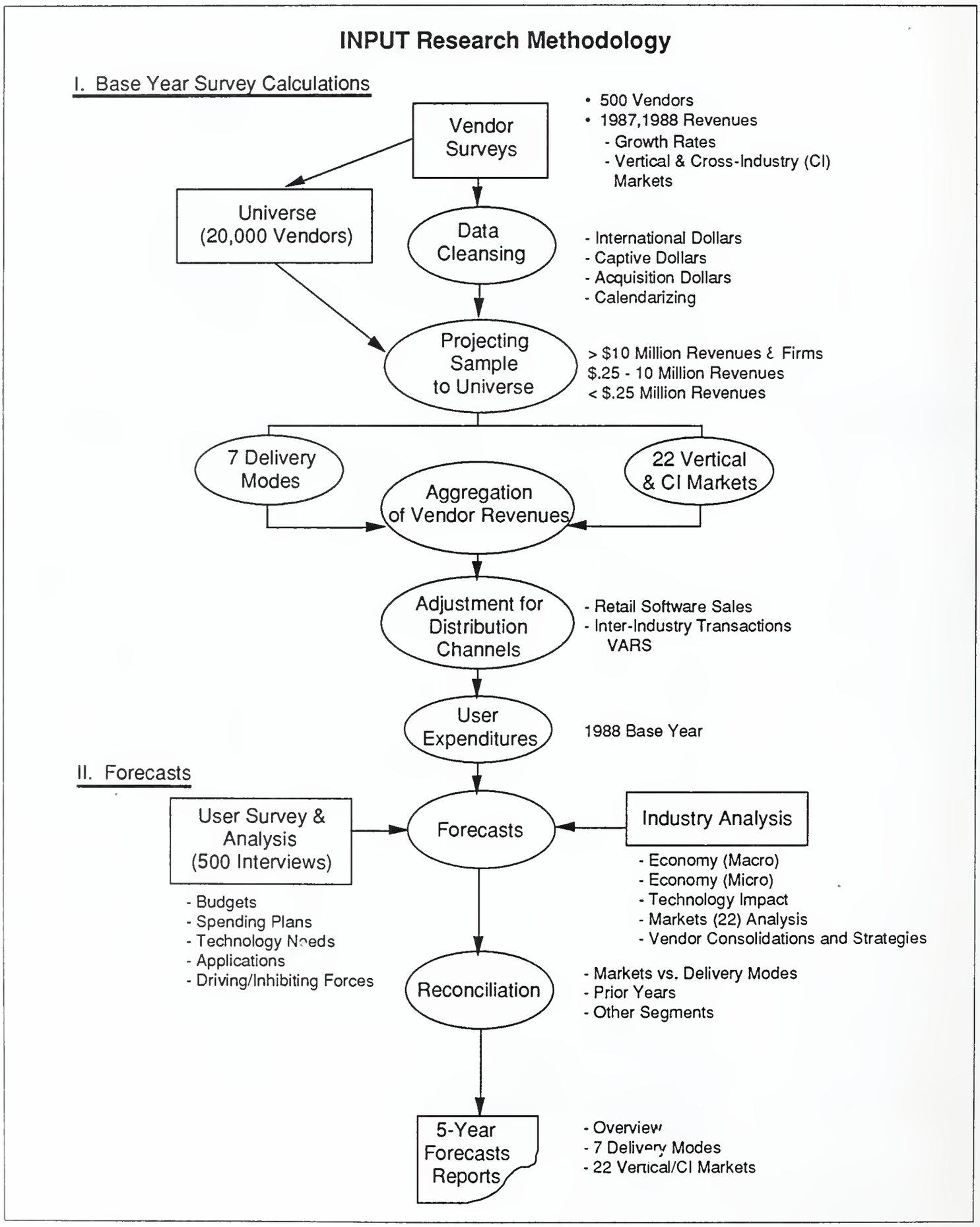
EXHIBIT I-2



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In the case of the few very large vendors that did not respond to our survey, INPUT estimated vendor revenues from its own contacts and secondary sources. These estimates were then mailed to the CEO for verification. This process was done for all firms with more than $10 million in U.S. revenues in any one delivery mode. For firms with revenues below $20 million (and not specifically covered in the survey), INPUT created a model based on the number of such firms identified in each delivery mode and their expected average annual revenues.

For each company, INPUT subtracted revenues identified as:

- International (non-U.S.)
- Captive (within the organization)
- Acquisitions-related

These surveys and estimates produced the initial vendor revenue estimates for 1988. Total base year (1988) revenues are then summed into six delivery modes and 15 vertical and seven cross-industry segments for closer analysis and five-year projections. The revenue data in this report provided for individual companies only include the following:

- U.S. revenues. Only revenues derived from products or services sold in the U.S.

- Processing services revenue.

- Noncaptive revenues. Only revenues available to all vendors in an open, competitive marketplace are included. Revenue derived from sales to a partner or affiliated organizations are excluded. An example would be the sale of processing services from Litton Computer Services to another Litton division.

- Calendar year revenues. Approximately 30% of the vendors surveyed have fiscal years that do not coincide with calendar years. Revenues of these companies have been adjusted to a calendar year basis for consistency.

For certain delivery modes, vendor and user expenditures are fairly close; for others they are markedly different. Many microcomputer software products, for example, are marketed through distribution channels such as retail stores and value-added resellers (VARs), where conversion factors must be applied to determine the total market size based on vendor revenues. In addition, some software is sold by vendors into other information services sectors, such as processing services and network services. This software may be used in these other sectors' data centers and never be passed to the end user. INPUT deletes such "intraindustry" transactions from its user expenditure market data.

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The following table shows the factors used by INPUT to convert vendor revenues to user expenditure (market size) figures for each delivery mode:

• Applications Software Products	1.18 *
• Systems Software Products	1.10 *
• Turnkey Systems	0.99
• Systems Integration	0.99
• Professional Services	0.99
• Network Services	0.99
• Processing Services	0.99

*Since the vendor data collected are at the producer point, not the eventual seller (retailer)

From the 1988 user expenditures thus calculated, INPUT projects five-year market growth rates for each delivery mode and vertical/cross-industry market, based on its analysis of technology, vendor activity, driving and inhibiting forces affecting each market, and the U.S. economic outlook.

D

Economic Assumptions

Forecast numbers are presented in current dollars (i.e., 1994 market sizes are in 1994 dollars). In developing the five-year forecast, INPUT has incorporated the following economic assumptions regarding the outlook for the total U.S. economy:

As shown in Exhibit I-3, real GNP growth is projected to decrease from an anticipated 2.8% annual rate in 1989 to a range of 2.0% to 2.5% over the next five years, before returning to approximately current levels in the second half of the 1990s. In addition, the inflation rate, as measured by the GNP deflator, is expected to increase modestly from a projected annual rate of 4.5% to 4.8% between 1989 and 1994.

GNP and GNP deflator growth rates contained in INPUT's economic forecast model are based on the U.S. Department of Commerce statistics for the full year of 1988 and the first three quarters of 1989. The full year economic predictions for 1989 include INPUT's fourth quarter GNP and GNP deflator projections. The growth in real GNP and the GNP deflator changes for the years 1990 through 1994 are based on INPUT's economic assumptions which reflect other economic forecasting models for the same period. These assumptions are conservative in light of current economic trends.

Primary expectations affecting INPUT's outlook for nominal GNP growth rates over the next five years include a continuing slowdown in consumer spending, modest increases in consumer income, further slowing in the rate of increase in federal defense spending, the need to

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reduce the federal budget deficit, and product-cycle maturation in certain key technology sectors.

Historically, the information services industry has been more resilient to slowdowns in real GNP growth than have companies in the electronic components and equipment sectors. However, the ability to pass on inflationary pricing pressures is more varied in the information services industry, reflecting the particular labor/material mix in the cost structure of individual delivery modes.

EXHIBIT I-3

GNP and Inflation Growth Rate Assumptions, 1989-1994

	Annual Growth Rate (Percent)						
	1988 Actual	1989	1990	1991	1992	1993	1994
Real GNP	4.4	2.8	2.5	2.3	2.0	2.0	2.0
GNP Deflator	3.0	4.8	5.2	5.5	5.0	4.5	4.5
Nominal GNP	7.4	7.6	7.7	7.8	7.0	6.5	6.5

GNP = Gross National Product

Source: U.S. Department of Commerce

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II

Executive Overview

II

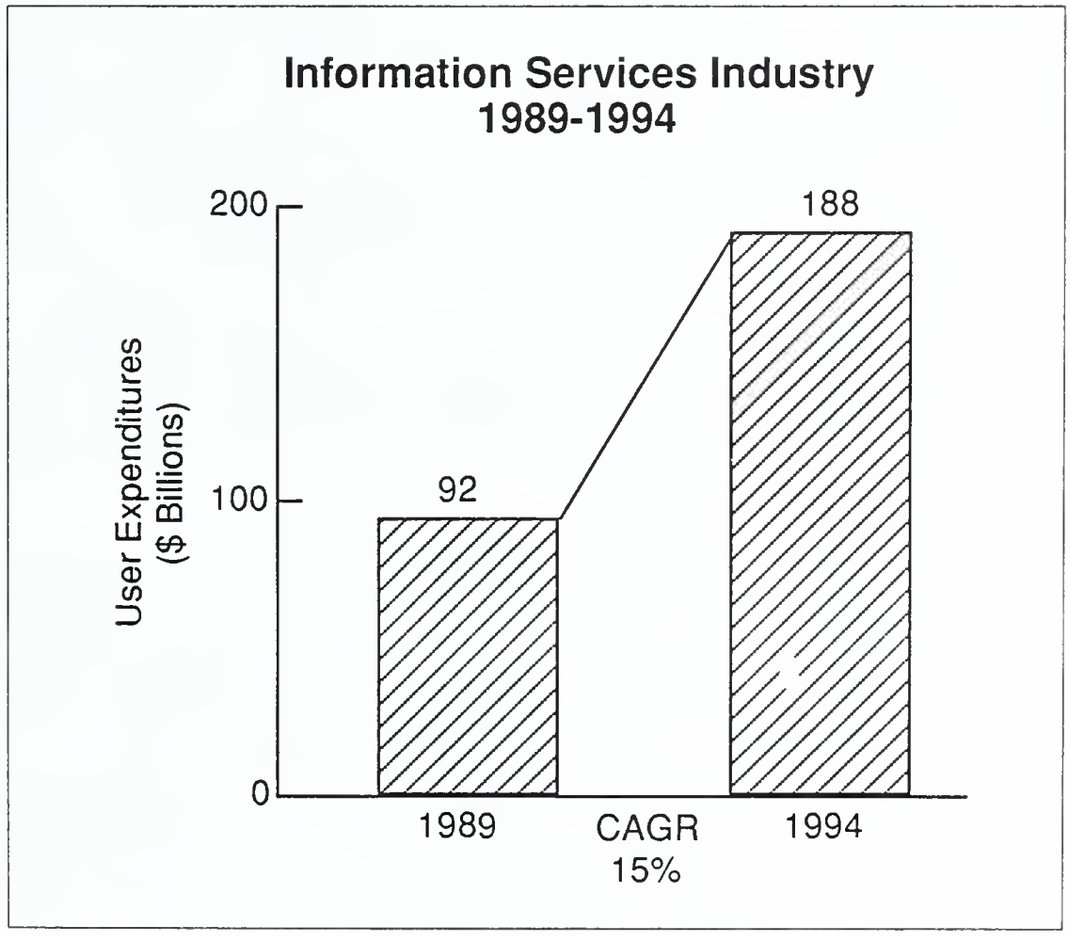
Executive Overview

A

Overview

The processing services delivery mode is one of the six delivery modes that make up the information services industry. As shown in Exhibit II-1, the information services market is projected to grow at a rate of 15% from 1989 to 1994.

EXHIBIT II-1



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The processing services sector is generally a mature market that grew rapidly in the 1960s and 1970s through access to shared computers for transaction processing, problem solving, information analysis, and other uses. In the 1980s, the business mix changed dramatically as timesharing activities were transferred to small systems, notably personal computers, while transaction processing and system operations (facilities management) forged steadily ahead. Those applications and system operations that required networks and shared access among companies, such as credit card and other bank processing, became particularly attractive opportunities. In recent years growth has been steady at around 12%, but there is now the opportunity for more rapid growth in the 1990s as outsourcing becomes more prevalent.

B
Processing Services

1. Driving Forces

Despite frequent predictions of its imminent demise, processing services continues to grow, as shown in Exhibit II-2. The reasons for this viability are summarized in Exhibit II-3.

First, many current users of processing services find it convenient to have a third party process specific applications or functions, using expertise or facilities the customer does not possess. Without a compelling reason to change, a customer continues with the service and typically adds to it in volume and scope as time progresses. This "loyalty" has allowed several large processing services to grow steadily. ADP, the industry leader, has reported quarterly growth in revenues and profits for more than 110 consecutive quarters, primarily because of growth in its payroll transaction business.

Second, the trend to outsourcing is growing. Many businesses make conscious decisions not to process new work in their own data centers, and use outside vendors because of development time required, additional computer resources needed, operational expertise, or a combination of these factors.

Third, innovative vendors continue to create industry-specific applications geared to the needs of clients who have become more sophisticated and want solutions keyed to their own businesses. Vendors who anticipate such needs, and can deliver products with more capability than users can create in-house, find receptive buyers. Vendors can choose how to offer such solutions to customers; in many cases they can offer the same solution in various combinations of processing services, application software products and turnkey systems. Customer need, degree of autonomy, competition, and cost/price factors determine the optimum mix.

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EXHIBIT II-2

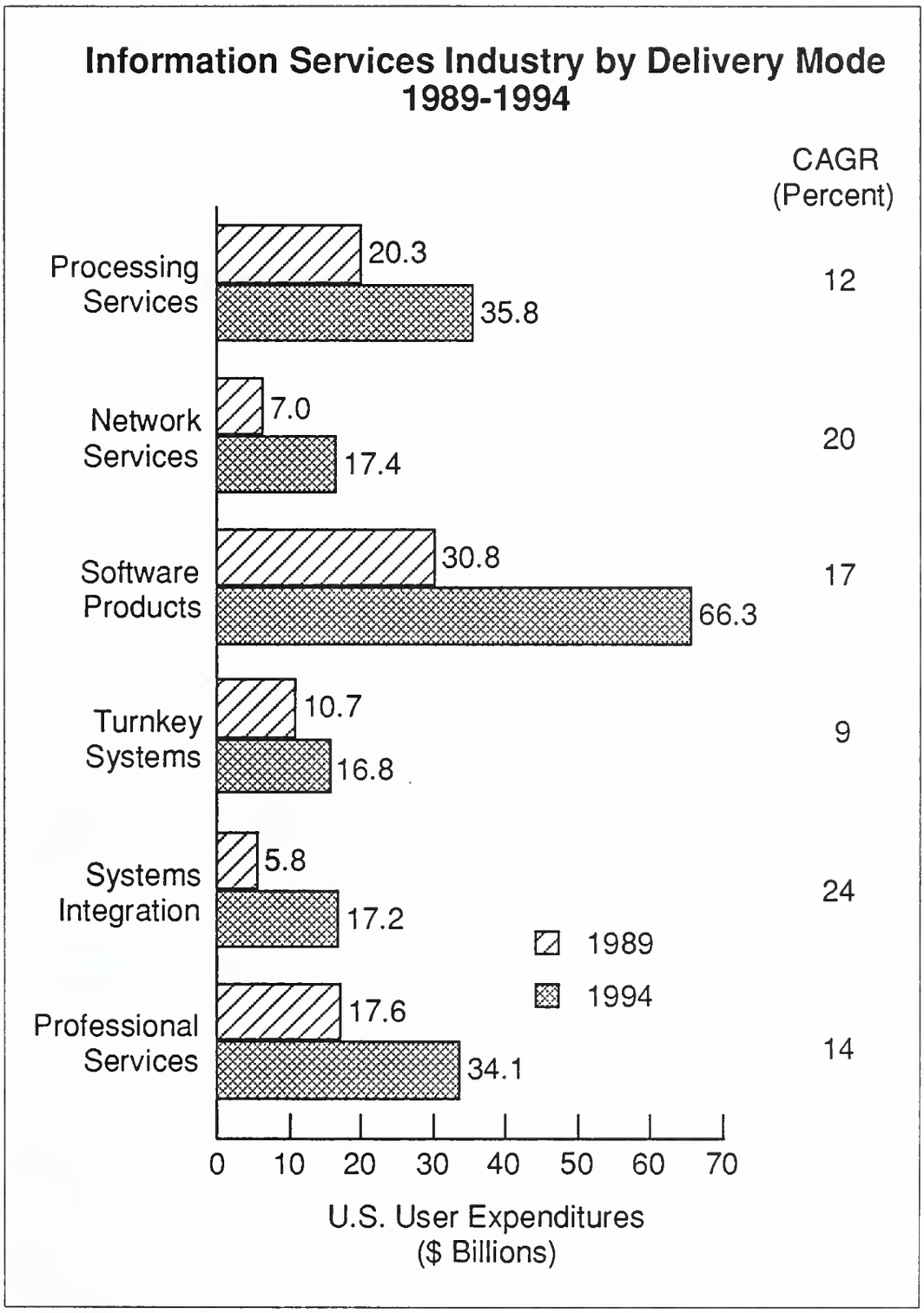

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EXHIBIT II-3

Processing Services Market Driving Forces

- Customer convenience and inertia
- Outsourcing trends
- Industry-oriented solutions
- Time-critical solutions
- Systems integration project extension
- Innovations by vendors

Processing services vendors are able to offer solutions today. For a user with a large backlog of applications in the queue for the in-house development staff, this immediacy presents an attractive alternative.

The completion of complex systems integration projects will create additional demand for systems operations contracts, as users realize that the organizations most capable of running such systems are the vendors that built them.

Finally, the innovations that have characterized this industry from its inception continue to fuel market growth. New ideas, such as optical storage file creation, can be quickly accepted by large numbers of users.

2. Inhibiting Forces

However, the factors working against industry growth and success, shown in Exhibit II-4, are widely recognized. Increasingly powerful workstations and personal computers have continued the trend toward cost-effective in-house alternatives begun by minicomputer vendors in the 1970s. As more PC/workstation applications become widely available, this will increase pressure on the processing services vendors offering comparable solutions.

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EXHIBIT II-4

Processing Services Market Inhibiting Forces

- Micro/workstation/minicomputer capabilities
- Price/performance disadvantages
- Market entry costs
- Perceived high processing prices
- Perceived control
- Market maturity
- TBDF restrictions

In the 1980s, when both the technology and the software (VisiCalc, Lotus 1-2-3) became available, many of the smaller, single-user, problem-solving personal applications moved from timesharing—whether in-house or externally offered—to personal computers or workstations. Now, with personal computers/workstations linked to file and communications servers and suitable software becoming available, the next wave of applications is shifting from central systems to local systems.

The availability of PC and workstation software is pulled by the very large number of installations of these systems and by the still-falling cost of computer hardware. This large market potential attracts many software developers, both in IS departments and among software vendors. The eventual price of the software they develop can be much lower than mainframe-based packages, whether offered with or without processing.

This ebb and flow between in-house activities and processing services is the constant state of the industry. Growth in the industry has always been the difference between new and expanded customer sales, and losses through transfer from the service mode to in-house facilities—including turnkey systems. In examining the 'trade-offs' in the approaches, many in-house and external staff only compare computer equipment/software cost with the service, thus making the latter look expensive.

Another inhibitor to the use of processing services is the perception by customers of having more control if they have the system in-house. In many cases this is a fallacy, if control is defined as the ability to monitor and change the process; vendors can often provide more flexibility and inspection than a customer simply because of the scale of the operation. Security may also be better provided externally.

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The one area of control in which vendors have had less success in the past is that of cost control. When a customer has its own system it can control costs easily—often with processing services purchased on resource use, the customer was not able to exercise this control. Today however, most successful vendors price by transaction or some method of fixed pricing so that the customer can budget for an expected level of service.

Market entry costs are high; computers and software required to serve a large number of users is expensive, and the time required to develop specific, dependable, and feature-rich software also converts to high costs. INPUT expects that most firms seeking to enter the information services industry may choose software development and professional services as the paths of least resistance and lowest cost, unless they have installed a computer/communications network 'plant' that can be easily used as a base for processing services. This barrier to entry discourages new and innovative vendors.

The processing services market is mature, and much of the rapid growth expected from an emerging market has already been achieved. With a $20 billion base, a slowly declining growth rate is likely in the 1990s.

Finally, international processing services opportunities are likely to be constrained by transborder data flow (TBDF) restrictions on the part of various governments.

The great advantage of the processing services business is its predictability. Many vendors have 90% of next year's business locked up through recurring revenues before the year-end. In the transaction processing and system operations markets, the relationship between the customer and the vendor is such that the vendor usually has to fail significantly in service or new product for the customer to leave.

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III

Processing Services

III

Processing Services

A

Issues and Trends

Emerging in the 1960s and growing to prominence in the 1970s, the processing services sector has spawned a number of large and very successful service organizations.

However, growth rates have slowed in recent years as this market matures, and INPUT now projects a relatively modest 12% growth rate for the next five years. This growth rate is still several times larger than the growth of the U.S. economy as a whole. Processing services is still a healthy market that has good revenue and profit potential.

The major trends in the processing services industry are shown in Exhibit III-1.

- 'Outsourcing' of information systems, particularly through systems operations contracts, has taken hold—notably through IBM's contracts in 1989 and the continued success of EDS, Litton Computer Systems, and others. Last year outsourcing was considered an issue—this year it is an accomplishment.

- Leading vendors have achieved strong positions in their selected markets. Companies like Automatic Data Processing, Electronic Data Systems, Control Data, American Express Information Services, and Mellon Bank have achieved significant revenues and profits from the processing services industry; they have the size to invest in the new applications software and systems that customers will need.

- As both an offensive and defensive strategy, vendors are offering their solutions to clients in an expanded mix of delivery modes. Software products, turnkey systems, systems integration, and professional services are changing the revenue mix and market positions of numerous companies.

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- Large users of computer systems have moved into a vendor role by offering industry-specific and/or utility processing solutions to their suppliers, customers, or peers. Bechtel, McKesson, AMR (American Airlines), and a number of commercial banks have adopted this strategy. On the other hand, aerospace companies such as Martin Marietta and McDonnell Douglas have retrenched their vendor operations in the past few years.

EXHIBIT III-1

Trends in Processing Services Markets

- Outsourcing taking hold
- Entry of IBM
- Major vendors have strong positions
- Expansion of service delivery modes
  - Systems integration
  - Software packages
  - Turnkey systems
  - Professional services
- Customers become vendors
  - Bechtel
  - McKesson
  - AMR
  - Mellon Bank

The continued growth of the processing services market depends on several factors, shown in Exhibit III-2. First is the trend toward outsourcing of data processing applications work. As long as large numbers of organizations are willing to off-load certain applications or processing requirements to third-party vendors, the market will remain viable. It is INPUT's conclusion that this trend will continue and actually accelerate.

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EXHIBIT III-2

Processing Services Issues

- Outsourcing—will it continue?
- Impact of in-house systems: Shared/distributed systems?
- Voice/data processing opportunities
- Consumer services—fad or fact?

The proliferation of supermicros, powerful workstations, and file servers as departmental systems will complicate the ability of IS departments and processing services vendors to deliver integrated solutions across distributed systems and data bases. Though such complications may slow the growth of "conventional" processing services, vendors that can adapt to it will gain a market advantage.

Technology will rapidly provide combined voice/data networks (i.e., ISDN) that will change the way data communications requirements are executed. This will introduce a barrier to "business as usual" remote processing, but it can also become an opportunity for innovation.

Consumer-oriented services will provide a significant opportunity for network and processing vendors. The unknown factor is the degree to which the 30 million personal computers now installed in the U.S., and the millions more to be installed in the 1990s, will be used by individuals for personal services. INPUT is confident that innovative vendors will find ways to tap this huge potential market. Retail, finance, banking, and insurance applications will emerge in the forecast period.

A key ingredient is that the vendor takes responsibility in many cases not only for operation of the system but also for the development of the software needed for the future. It is in this area that the large processing services companies have a major advantage over application software products companies.

Customer requirements for information systems can still be satisfied via the processing services channel, provided that specific needs can be met. Exhibit III-3 lists these needs.

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EXHIBIT III-3

Customer Requirements for Processing Services

- Rapid response to changing conditions
- Flexibility in delivery mechanisms
- Expanding variety
- Customization
- Innovation
- Economy (within context of these factors)
- Responsibility

Specifically, the more tailored, vertically-oriented, and flexible solutions are more likely to receive high levels of client acceptance, and are less vulnerable to replacement.

B

Market Forecasts

The processing services market is expected to grow at a moderate 12% rate between now and 1994, as shown in Exhibit III-4. Currently it is the second largest of the individual INPUT delivery modes, after the combined applications and systems software product delivery mode.

As shown in Exhibit III-5, real growth in this market segment will be approximately 7%-9% per year for the next 5 years—about 3 to 4 times the growth rate of the GNP.

The segments of the processing services market exhibit a widely varying set of growth rates, as described in Exhibit III-6. Each of these is described in following sections of the report.

As shown in Exhibit III-7, processing services markets that are specific to industries will grow faster than general, cross-industry services.

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EXHIBIT III-4

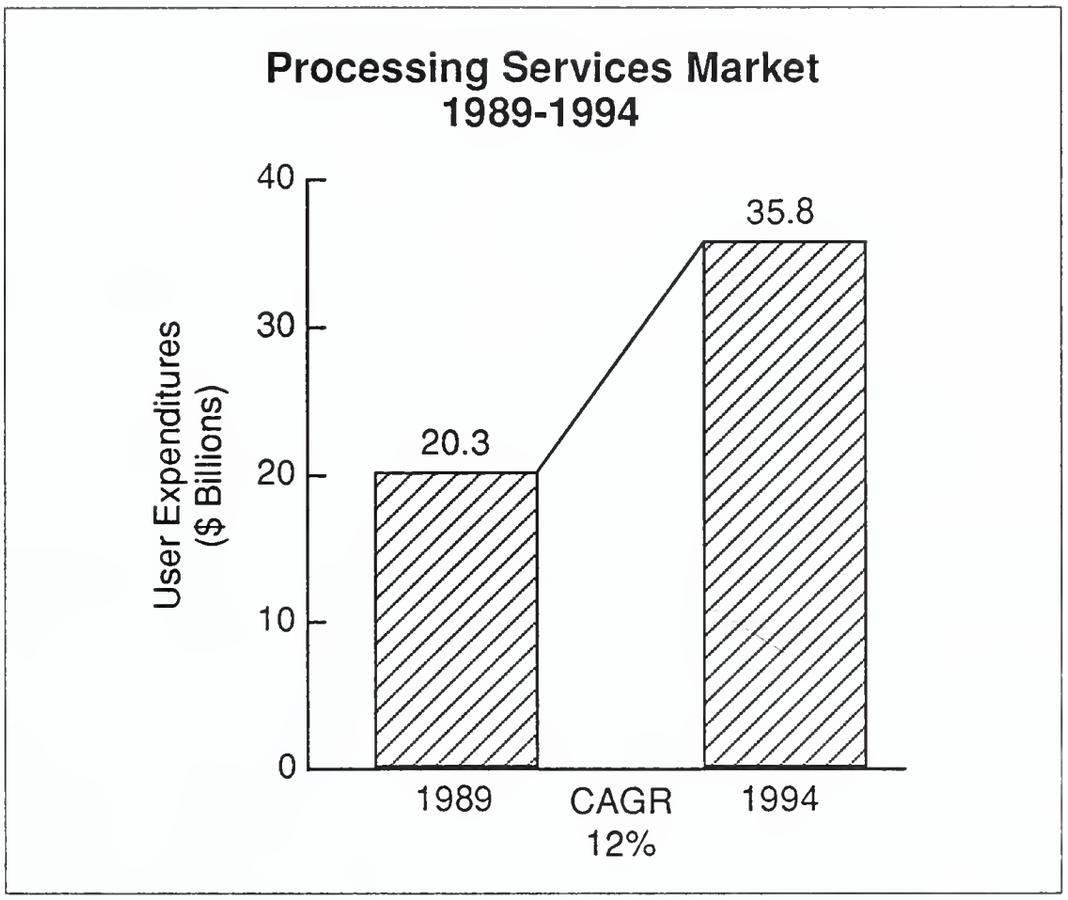

EXHIBIT III-5

Processing Services—Real and Nominal Growth 1989-1994

	Annual Growth Rates (Percent)						
	1988	1989	1990	1991	1992	1993	1994
Real Growth	9.0	7.2	6.8	6.5	8.0	8.5	8.5
GNP Deflator	3.0	4.8	5.2	5.0	5.5	4.5	4.5
Nominal Growth	12.0	12.0	12.0	12.0	13.0	13.0	13.0

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EXHIBIT III-6

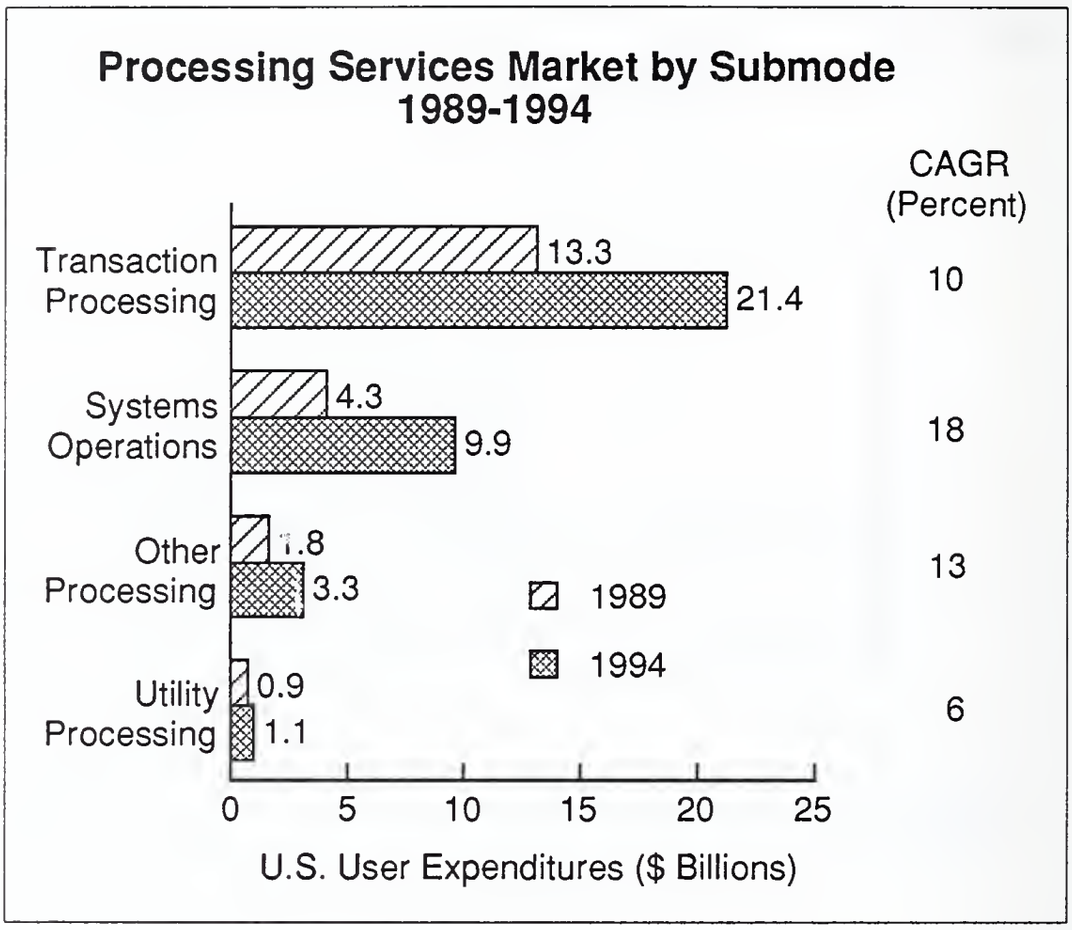
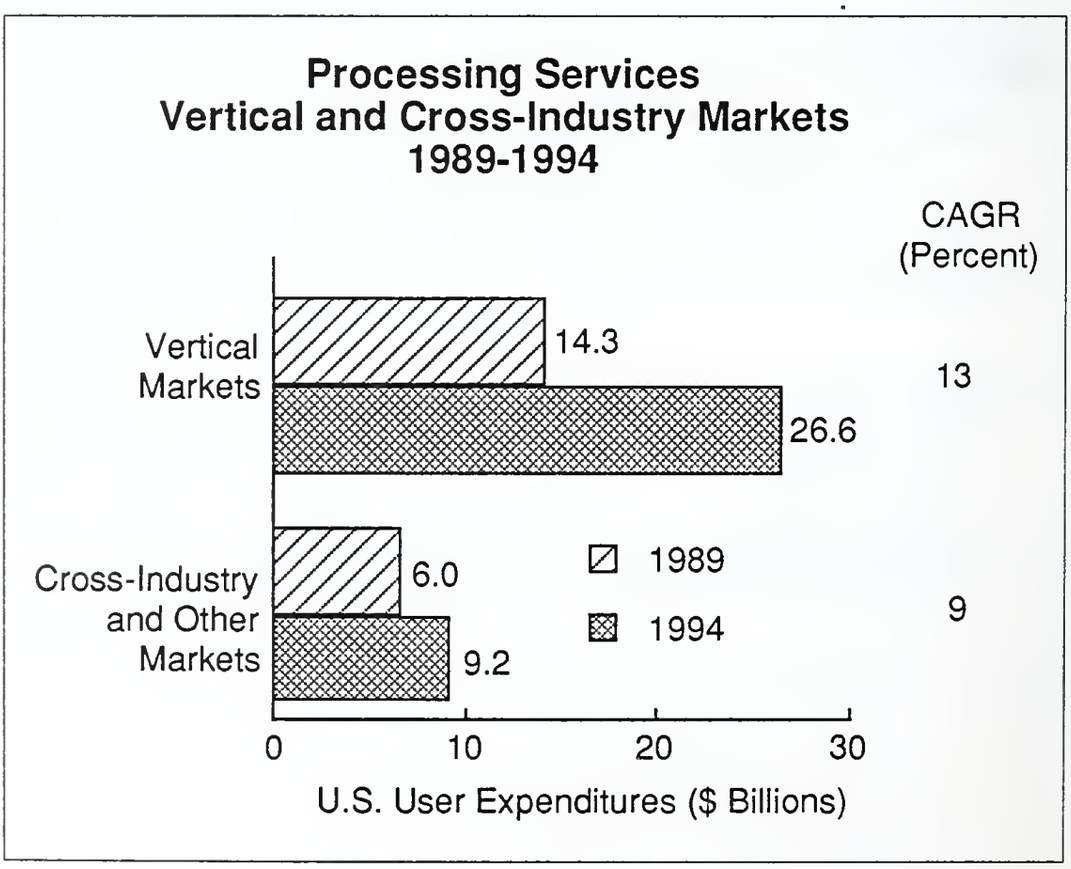


EXHIBIT III-7



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The banking and finance sector remains the dominant vertical market in terms of processing services expenditures. From almost $4 billion in 1988 (over 20% of the processing services industry total), banking and finance will grow at least 14% per year in the forecast period.

The transportation market has achieved strong growth, largely based on the use of airline computerized reservation systems (CRSs). Airlines pay approximately $2 per reservation to the major CRS operators—AMR (Sabre), Covia, and TexasAir (SystemOne).

The medical industry has reached a plateau in the use of processing services by hospitals. Processing services for clinics and physicians' groups continue to grow.

Other significant industry-specific processing services markets are in tax services for accountants, insurance claims processing, and dealer services.

In cross-industry applications, nearly $1.5 billion is generated from payroll, personnel, and other human resources-related applications. Market leaders in this area are ADP, Paychex, Bank of America, and Control Data Corporation.

C

Mergers and Acquisitions

In all segments of the information services industry, as well as among equipment manufacturers, mergers and acquisitions are running at a near-record pace.

The reasons for such activity are many:

- The increasingly competitive nature of the industry makes it harder for small and medium-sized firms to survive and deliver the quality products users desire. Consolidation is often the only way for smaller vendors to remain viable.

- Entrepreneurs who have founded many of the faster-growing companies in the industry are increasingly ready to reap their profits by selling to a larger vendor, especially in a difficult climate for taking small companies public.

- Companies are aggressively seeking partners to expand the scope and quality of their services and are willing to pay premium prices for acquisitions to achieve this goal.

- Vendors have realized that they are in a stronger competitive position when they can provide a complete range of services within their selected market niches. It is often more cost-effective to buy this expanded presence than to develop it internally; significant time and resources are required to build from within.

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Processing services companies are particularly attractive to some buyers because of their repetitive revenue streams. Welsh, Carson Anderson, and Stowe is one financial organization that has emphasized investments in this industry with considerable success.

Overall, acquisitions are rapidly consolidating this segment of the industry. Since the cost of de novo entry is high, only organizations that already have substantial plant and personnel in place, such as the IS departments of large companies, can enter effectively. This will make competition in the future more intense. This competition in itself will expand the market.

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IV

Transaction Processing Services

IV

Transaction Processing Services

A

Overview

The transaction processing sector is characterized by the customer's willingness to 'off-load' an application or application set, often of a critical business nature. The willingness of user organizations to resist bringing these important applications onto their own in-house systems depends on the vendor's ability to perform such applications in a cost-effective and reliable manner. When the vendor can achieve this, there is strong inertia not to bring the application in-house.

Transaction processing services constitute the dominant form of processing service delivery. Vendors such as ADP, EDS, American Express Information Services Company, FFMC, Mellon Bank, Shared Medical Systems, and National Data Corporation derive a large share of their revenues from such activity. INPUT estimates that transaction processing will continue to be the primary revenue source in this market, and that it will grow at a compound annual growth rate of 10% over the next five years, as shown in Exhibit IV-1.

However, entry into the transaction processing segment is not easy. The start-up cost of processing services operations is high, and prominent vendors are entrenched.

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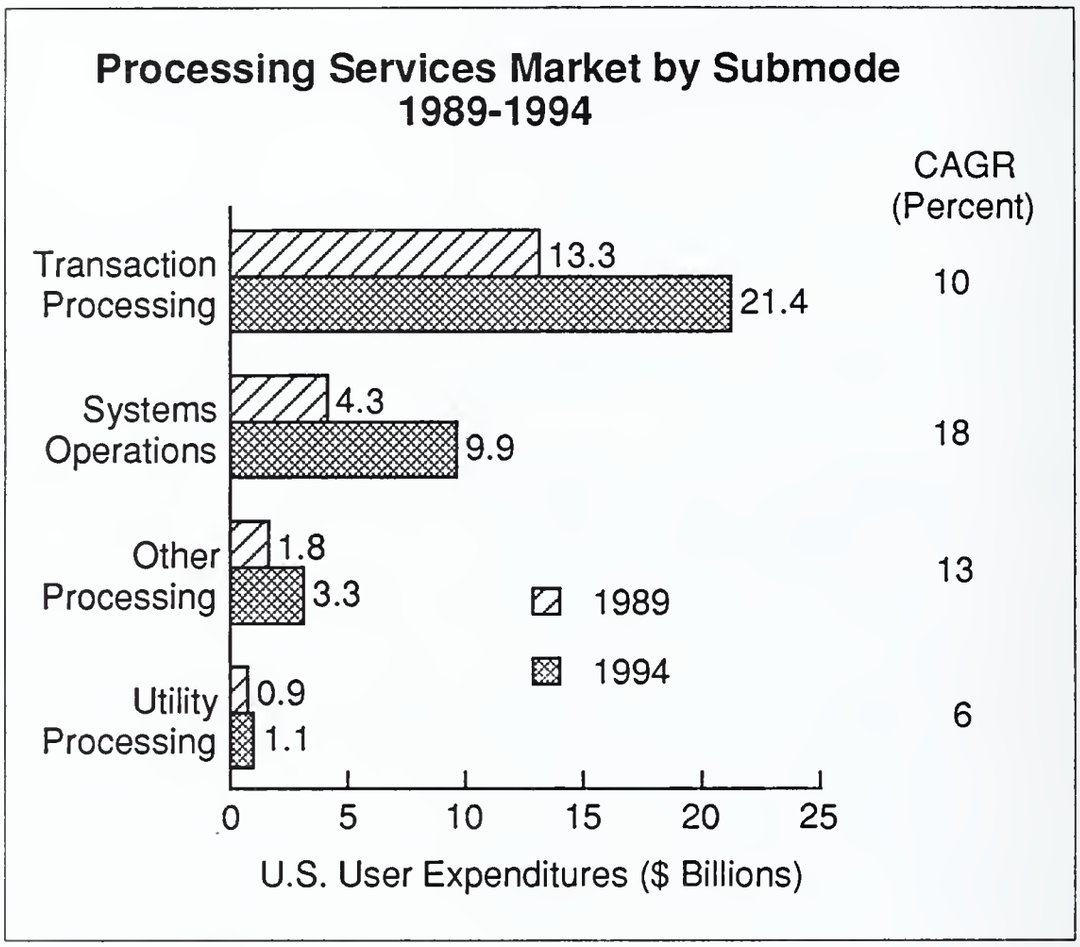
EXHIBIT IV-1



B
Sector Markets

The transaction processing services market by industry and cross-industry sector is shown in Exhibits IV-2a and IV-2b. Issues, trends, and factors affecting the market vary considerably from sector to sector.

1. Discrete Manufacturing

Transaction processing services in this sector are focused on individual industries and particularly on small and medium-sized companies. Typically, these applications are not manufacturing applications but are for auxiliary operations such as distribution, human resources, and business management. Standard application services are offered by companies such as McDonnell Douglas, BCS, Schlumberger, and Power Computing.

2. Finance and Banking

By far, the largest set of transaction processing services applications are included in this industry sector. Transactions for and about money continue to grow.

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EXHIBIT IV-2a

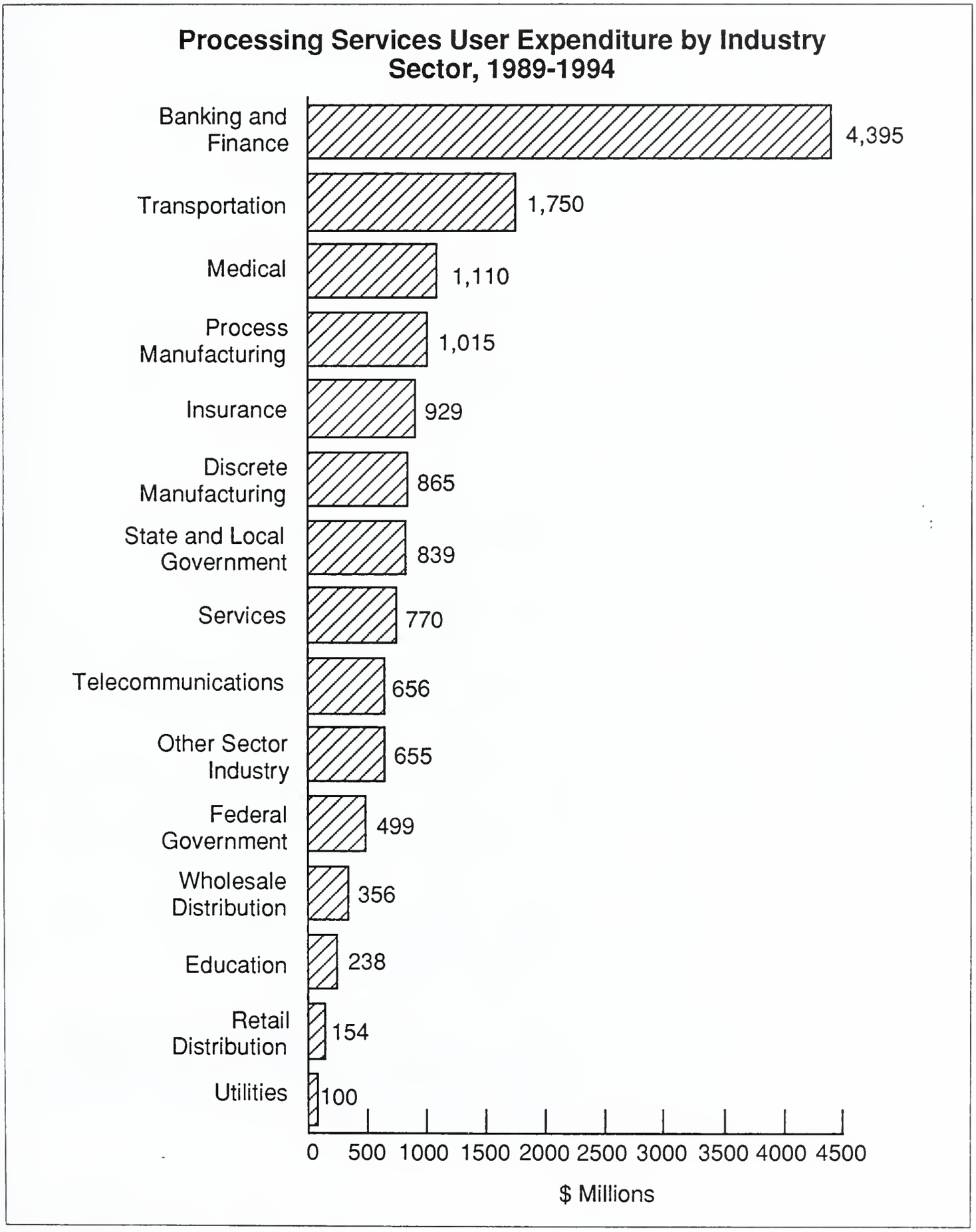

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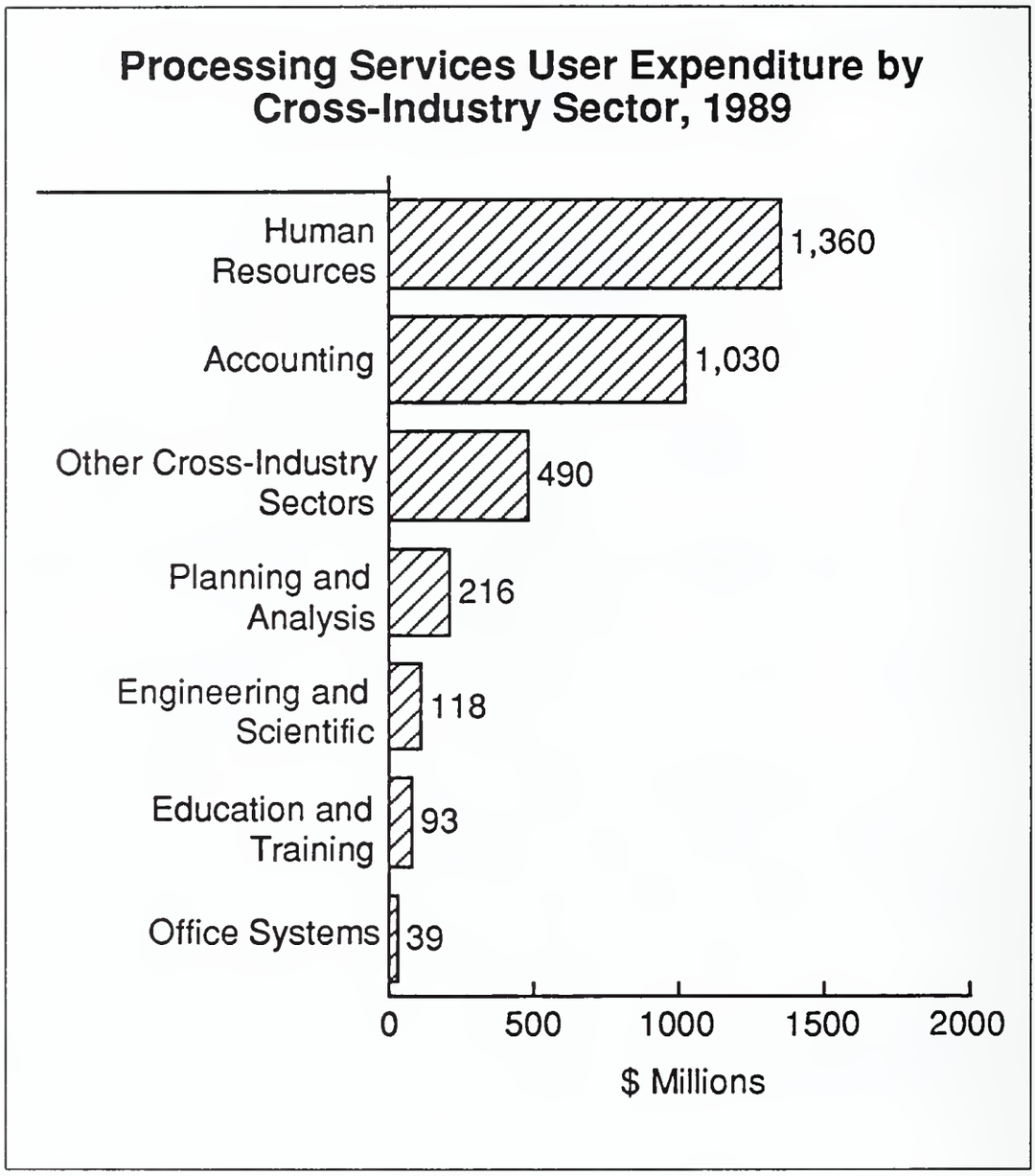
EXHIBIT IV-2b



Plastic card processing, primarily for credit cards, is an over $1 billion market in the U.S. Excluding processing performed by VISA and MasterCard, it is led by companies such as American Express's First Data Resources unit, FFMC's NaBanco unit, EDS, and National Data Corp. Credit card services are actually a cross-industry market, as they are provided to food, lodging, and entertainment organizations as well as to financial institutions. Check and credit inquiry and authoriz tions services are treated as electronic information services.

Back-office processing constitutes the majority of the transaction processing services market. Most of the 20,000 banks and thrift institutions ('thrift' is the wrong word to apply to the Savings and Loan companies at this time) have their processing done for them through either transaction processing or systems operations contracts.

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The largest vendor in this market is Mellon Bank, which received over $780 million from processing services in 1988 from banks, trusts, and stock transfer companies. Mellon's processing services business is primarily with commercial banks, as is that of two of the next-largest companies—EDS (including its MTech acquisition) and First Financial Management Corporation (FFMC).

Citicorp, which is of comparable size in transaction processing services, has a wide distribution of back-office services to banks, brokerage organizations, sales, and trust companies.

Trust department services are provided by DST, SEI, and SunGard Data Systems.

All of these transaction processing services applications are also provided by major vendors under systems operations contracts. Systematics, EDS, and FFMC are leading providers of such services.

3. Insurance

The insurance industry sector transaction processing services market is primarily composed of claims processing services provided by companies such as Policy Management Systems and EDS. Most claims processing services are, however, provided under systems operations contracts.

Because service claims handling activities are being decentralized to local offices, central processing services will not grow as fast as they have in the past as standalone applications services. On the other hand, systems operations—which take total responsibility for the processes—will grow more rapidly because of the complexity of such systems.

Agency records processing will also continue to grow. Its growth will be limited by the use of powerful local systems (such as new PCs networked with file servers). However, these systems will be supplied on a service basis.

4. Medical

Transaction processing services in the hospital sector are static or declining. Vendors such as Shared Medical Systems and American Express (McDonnell Douglas Health Systems Company) have found their shared services transaction processing for administrative applications declining in recent years. This was due to a shift to in-house processing, facilitated in many cases by more advanced turnkey systems from companies such as HBO and from SMS and HSC themselves.

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Systems operations for larger hospitals and hospital chains will become more attractive as these organizations seek to drive down costs in the 1990s.

Processing services for other parts of the medical industry, such as clinic and physician services, laboratories, and nursing homes, continue to grow slowly. In many cases, they require use of an interface to personal computers/workstations at the customer's site.

5. Telecommunications

The prime application for transaction processing services for this industry sector is billing; it accounts for the majority of the $560 million in 1988 user expenditures. One of the fastest growing segments has been billing for cellular telephone systems.

Other applications services from companies such as CBIS, Comshare, and GEIS include service order processing and account management.

6. Transportation

Computerized reservation systems (CRSs) from airline-owned vendors account for over two-thirds of the transportation market. This market is expanding at about 15% per year with the worldwide increase in air travel. Payments by airlines alone, excluding travel agent payments, accounted for $840 million in 1986 in the U.S.—this grew to almost $1.1 billion by 1988.

Because of the increasing power of CRSs, there is a growing pressure to separate this business from parent airlines. Industry response has been partial separation and co-ownership. United Airlines' Covia operation, for example, is now owned by six airlines, including UAL. AMR's Sabre operation, which accounts for over 40% of the market, remains wholly owned by its parent. An attempt to merge it with the fifth largest CRS, that of Delta Airlines, was dropped earlier this year as a result of the Justice Department's threatened antitrust suit.

Other transaction processing services relate primarily to intra- and intermodal freight shipping, including billing and shipment notifications. These services will continue to grow because of their intercompany nature.

7. Human Resources

The single largest transaction processing service is payroll. This market is led by Automatic Data Processing with almost $700 million in employee services revenues, primarily for payroll. Bank of America, Control Data Corporation and Paychex are other vendors with over $100 million per year in payroll services business.

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The dynamic nature of tax law and benefits plan changes, the increased integration of payroll with other human resource applications, and the increased complexity of payroll processes create conditions for continued steady growth.

However, the nature of services provided will change substantially. Customers need human resource management systems (HRMS) which are largely generated at their sites. Thus there is a great need for interfaces between internal and external systems. The opportunity for payroll services vendors is to provide the HRMS at the customer's site, linked to the payroll system which will have some processing (data entry and control and payroll management) provided at that site, while the central system is used for processing and deposit functions.

Benefits processing is another transaction processing service which is growing. Again, this is linked with payroll activities.

In the future, payroll services companies will in many cases provide processing capability at the customer's site through PCs/workstations on a service basis. They will download items such as tax tables and software changes through the network, which will also be used as the switch to deposit systems.

Software product and turneky system vendors can also move into this service mode by creating alliances with network vendors.

As a result, INPUT expects basic payroll services to continue to grow at about 10% per year, while ancillary services growth in human resources and benefits management increases the overall growth rate to 12% per year, or greater, over the next five years. Companies such as CDL and Paychex are already achieving more rapid growth than the industry norms, primarily through attacking new market segments (in the case of Paychex) or applying new technology or processing approaches.

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V

Utility Processing Services

V

Utility Processing Services

A

Issues and Trends

Utility processing is the use of computing power and tools to develop and/or tailor applications or solutions specific to users' personal requirements. Utility processing is primarily used in very large government, engineering and manufacturing environments. The vendor provides access to the computer through a communications network, with software tools and consulting support to enable the user to develop and run the specific application being created. Software tools usually include compilers, DBMSs, 4GLs, sorts, terminal hardware support, scientific and statistical libraries, graphics capabilities, financial modeling systems, and other application development tools.

Where local processing, storage, or memory capacity is too limited for a particular customer need, utility processing services are a potential answer. This particularly applies if the need is periodic, difficult to predict in intensity, or requires special skills. Similar reasons would be the need for special peripherals such as laser printers, scanners or large-scale plotters. Services primarily oriented to these products are discussed in the 'other processing services' market section.

A typical example of utility processing is supercomputer processing services. While "mini-super" and "super-mini" markets will grow more quickly, the market for supercomputer services will continue as long as customers require the sheer size and power of a CRAY or similar system. Small repetitive applications will shift to the minisupercomputers, just as small timesharing applications shifted to personal computers.

Organizations use utility services on a project basis. For example, software product companies, particularly small ones, buy time from vendors to develop and test their products. Other companies, converting from one system to another, buy resources during the change to avoid duplicative operations themselves. Utility processing can also be used to handle overload conditions on in-house systems.

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In government environments in particular, utility processing provides intermediate support while budget approval or procurement processes for in-house systems are proceeding. The more rapidly systems changes are required, the more useful is this approach, since bureaucratic acquisition processes are cumbersome and slow.

An additional reason for using utility processing is access to specialized software such as statistical or graphics packages. It does not make sense to accommodate a handful of users who need expensive special software or libraries on an intermittent basis on in-house systems.

In these cases, the trade-off between using an in-house system and a utility processing service is the efficiency of use, not only of the software, but of the support expertise necessary to use the software effectively. Particularly with new software, it often makes sense to try the system on a service basis before making the commitment to add it to the in-house portfolio. IBM's Information Network Service offers this facility to customers to test new software.

The utility processing services market suffered significantly from the advent and acceptance of minicomputer and microcomputer products. The success of the IBM PC and PC-compatibles has had an incredible impact on utility processing in the past 6 or 7 years. Many users moved work to PCs that was formerly developed, modified, and run through the use of utility processing on a remote computing service. Customers rode the price/performance curve of the small system. At the same time—and perhaps more importantly—new, easy-to-use software tools became available for small systems.

Single-user, repetitive, data base or problem-solving applications that required limited processing resources thus moved from services to in-house systems. A similar trend has emerged for departmental systems in the last several years, with the availability of powerful, economical midrange systems with applications software.

This trend will be amplified by the acceptance of 32-bit workstations/PCs connected with file servers in a LAN environment, when applications software becomes available.

Applications that require intercompany or interlocation interaction are not readily satisfied by local systems environments. Although an increasing proportion of such systems can communicate point-to-point and locally, the coordination necessary for a major system is generally not present.

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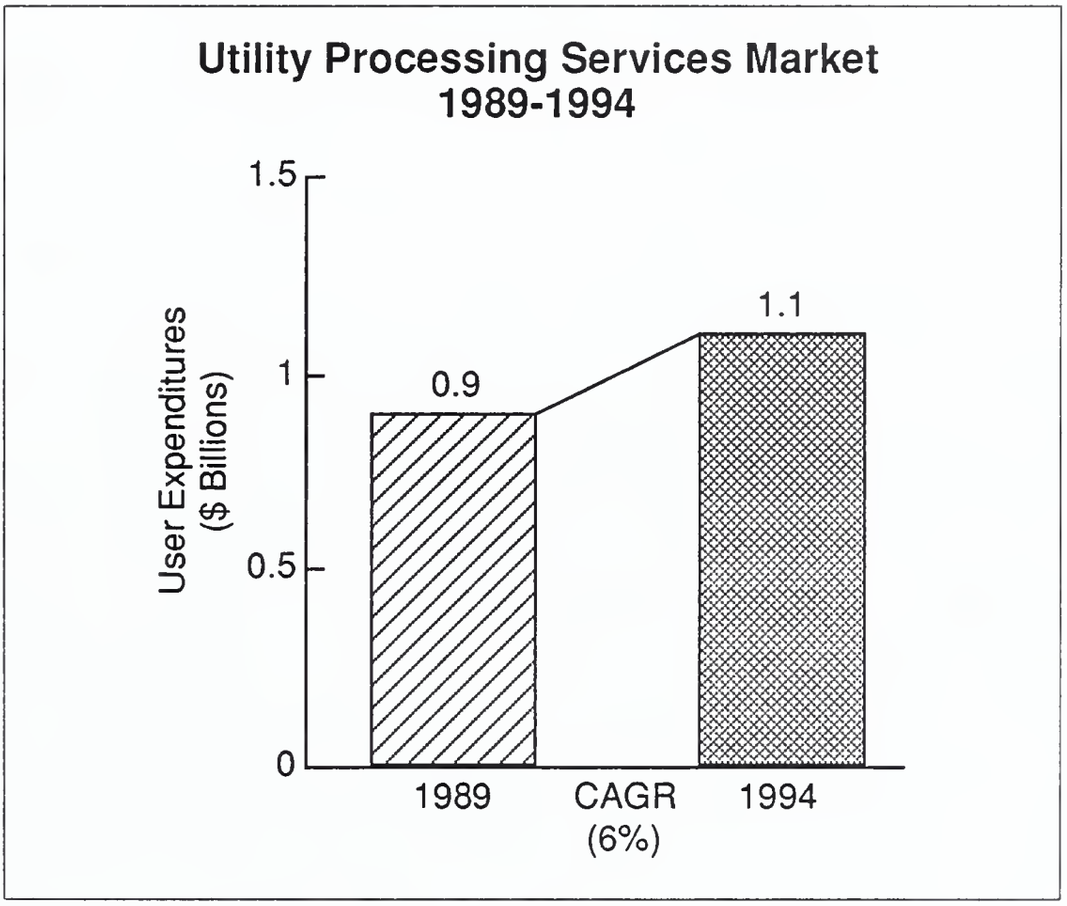
B

Market Forecasts

As shown in Exhibit V-1, the utility processing services market will be relatively slow-growing over the next five years.

EXHIBIT V-1



However, INPUT believes that utility processing may enjoy a resurgence in the 1990s. This may be linked to systems operations outsourcing. The only difference in definition relates to the nature of the contract: if the customer buys the 'utility' service on a long-term basis (at least one year) at a fixed or semi-fixed (minimum) price, it is systems operations; if the customer buys the service on a "pay as you go" basis, it is a utility processing contract.

Customers may buy all or part of a dedicated system at the vendor's site in a utility processing arrangement.

In order to be successful in this market a vendor must have the latest equipment, software, network, and support facilities as well as adequate staff to make the operation run effectively and efficiently. It is a market which is thus both capital- and skill-intensive.

As computer centers become more and more transparent (or hidden) to customers because of remote operations through networks, their need for their own centers will diminish. This will be especially true as the complexity of computer/communications networks increases. Many customers may contract out all or part of this operation and the 'Computer Utility' foreseen by Parkhill in 1967 will start to become a reality again.

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The driver to the 'utility' will not only be access to computation power as it was in the 1950s and 1960s, but access to effective operation of a multidimensional complex of multivendor computers, communications, software, and skills.

Companies such as Litton Computer Services—and, to a lesser extent, Genix and On-Line Business Systems—have operated successfully in this field.

One factor that limits growth and profitability in this market is the presence of 'spin-off' vendors, such as university-operated supercomputer centers, which price their services on an incremental basis. Their costs of services are covered by a 'captive' set of operations: the parent organization encourages the information systems organization to enter the market for utility services to limit or reduce these operating costs.

On the other hand, this scenario also applies to information services vendors. Utility processing is a means for vendors to obtain incremental revenue from customers. Many vendors have a passive attitude toward utility processing and merely accept the incremental business if and when it occurs.

- Some astute vendors, however, are proactive and provide specialized software tools and consulting aid to encourage customers to use utility processing.

- Proactive vendors market to user personnel who can develop the ad hoc software that would effectively use the enhanced resources of a large system. Large can apply to memory, processing, storage, peripherals, and/or support.

Utility processing can increase vendor revenue without having a significant impact on the requirement to obtain additional resources. In other words, the vendor cost basis does not need to increase linearly with the added revenue.

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VI

Other Processing Services

VI

Other Processing Services

A

Issues and Trends

Other processing services include computer output laser printing, disaster recovery and backup services, carry-in data entry services, and off-shore data entry. This sector includes the rapid growth of disaster recovery, spurred by several frightening experiences at Fortune 500 corporations (the First Interstate Bank fire in Los Angeles, and the 1989 earthquake in San Francisco, for example) which made it clear that large organizations with mission-critical systems are highly vulnerable if they do not have such services in place. Comdisco and SunGard Data Systems have achieved strong positions in the market.

IBM entered this market in 1989 through its National Service Division. IBM's Business Recovery Services now include the IBM Enterprise System/9370 and /3090 600S, as well as additional options for the deployment and testing of customers' backup systems. As an alternative to having their backup systems located at an IBM Business Recovery Center, customers may now have mid-range backup systems shipped by IBM to a designated location. Also, customers may now test their recovery plans via IBM's National Service Division remote links.

IBM has five midrange business recovery centers, as well as two sites for combined high and midrange recovery support. Most major computer manufacturers now offer such disaster recovery services in order to support their customers and protect accounts.

Several of the new entrants are from the third-party maintenance community. Both Intelogic Trace and Sorbus (a subsidiary of Bell South) are examples of such new vendors. Sorbus has formed a partnership with SunGard Recovery Services to deliver "hot-site" services for IBM 4300 users and "cold-site" availability for IBM and DEC midrange customers. Up to now, SunGard has proven its expertise in the IBM 3090 and 3080 arena, but has yet to penetrate the 4300 market. This alliance matches up

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SunGard's disaster recovery expertise with Sorbus' strong marketing presence in the midrange arena, which includes a large installed base of IBM 4300, IBM System/3X, and DEC system users. Under the new agreement, Sorbus will market disaster recovery services provided by SunGard.

The team will deliver hot-site services, providing customers with access to systems from SunGard's three "mega-centers," located in Philadelphia, Chicago, and San Diego (CA). In addition, customers can set up operations in cold sites in other cities.

Intelogic Trace launched its disaster recovery offerings for System 3X and AS/400 customers in June. IT will be providing hot-site coverage from ten locations within the U.S. There are currently some 50 vendors in this market.

The market for disaster recovery was approximately $350 million in 1988, and is growing at about 15% per year. However, there is potential for very rapid growth as the impacts of disasters such as the San Francisco earthquake make themselves felt. The importance of the earthquake was not the problems it caused, which were generally overcome fairly quickly, but the potential impact of the more severe earthquakes that will occur in the U.S.

Computer output microfilm (COM) services are established as a cost-effective way of storing and retrieving large amounts of digitized information. The market is still growing, even though the overall use of microfilm is stable or declining. The reason for this is that in-house installations are being turned over to outside services companies as their equipment becomes obsolete or their staff is reduced.

There are thus utility or commodity markets on both ends of the life cycles of technologies.

Until CD ROM or image processing systems with high densities become more prevalent at economic prices, the COM services market will continue to grow, albeit slowly. One factor is that microfilm readers are available for a few hundred dollars, whereas the least expensive effective optical storage systems, including their computer drivers, are at least an order of magnitude more expensive. As with other markets, it is not as much a question of replacement in the near term as of coexistence.

Leading vendors in this market are EDS, FFMC, Anacomp, and Zytran (part of Dun and Bradstreet). CD ROM and optical storage developments are creating opportunities for processing services. Data base conversion, for example to build optical storage files, is a growing business.

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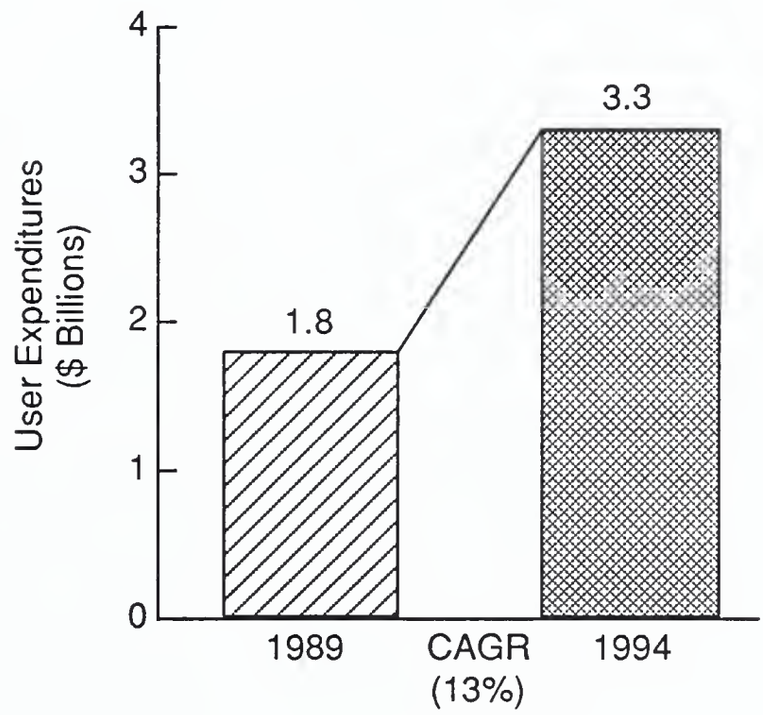
B

Market Forecasts

The market for other processing services will almost double in the next five years, as shown in Exhibit VI-1.

EXHIBIT VI-1



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VII

Systems Operations

VII

Systems Operations

A

Issues and Trends

The buyer issues shown in Exhibit VII-1 are the major ones driving the growth of the systems operations market. Executive management is looking to information systems (IS) organizations to develop solutions that make a difference in the competitive posture of their businesses. Many are recognizing that computer operations, particularly of non-mission-critical systems, do not make a difference in competitiveness. They are looking to outside vendors who provide satisfactory service levels at reasonable prices to free their internal resources and investment capital for strategic development activities.

EXHIBIT VII-1

Major Buyer Issues Affecting Systems Operations

- Core business focus
- Desire for improved service levels
- Lack of skilled operating personnel
- Control of operating and upgrade costs
- Completion of systems integration projects

The systems operations market is benefiting from the move to outsourcing, which is driven in part by the lack of qualified in-house personnel. User management is looking to the information services industry to develop approaches and techniques to improve service levels while at the same time increasing personnel efficiency by minimizing the labor content required in today's data centers. Customers are also concerned about the high cost of upgrading installed systems and look at systems operations as a method of sharing costs with a vendor.

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Systems integration contracts are also a natural source of new systems operations business. As systems integration projects are completed, some of the new systems will be operated for a short or long term by the integration contractor. Complex systems cannot easily be turned over to in-house organizations for operation and maintenance.

Primary trends in the systems operations market are outlined below:

- Users are seeking, and vendors are offering, a full range of services that include network management and operations, and applications maintenance and development. Some of these offerings overlap systems integration services.

- Long-term contracts are frequently negotiated, some being five or even ten years in duration.

- Contracts for "shared resource" services are being negotiated. The vendor agrees to perform the work in a data center(s) where multiple machines are linked together. The client may be unaware of which machine(s) are performing its work and at what location(s).

- Many vendors focus on one or two vertical markets where they have established skills and a reputation, and provide a range of services from industry consulting to prepackaged application software.

- Large market entrants are offering broad industry coverage; they are focusing on reducing operating costs and increasing productivity through leveraging investment and the application of technology to operations. These offerings will result in extremely competitive and attractive platform operations offerings with less focus on vertical market expertise.

- Fixed-price contracts are favored. Users prefer them as they make it easier to plan and budget. Vendors recognize that they provide vehicles to increase margins through exploiting investments in technology and productivity.

- Vendors are hiring client personnel to satisfy the staffing requirement of newly won contracts and to relieve the client of the systems operations staffing burden.

B

Market Forecasts

System operations is provided in two submodes: processing services and professional services. The commercial market for both types of processing services is approximately five times as large as the federal market. Together they will total almost $13 billion in 1994, as shown in Exhibit VII-2.

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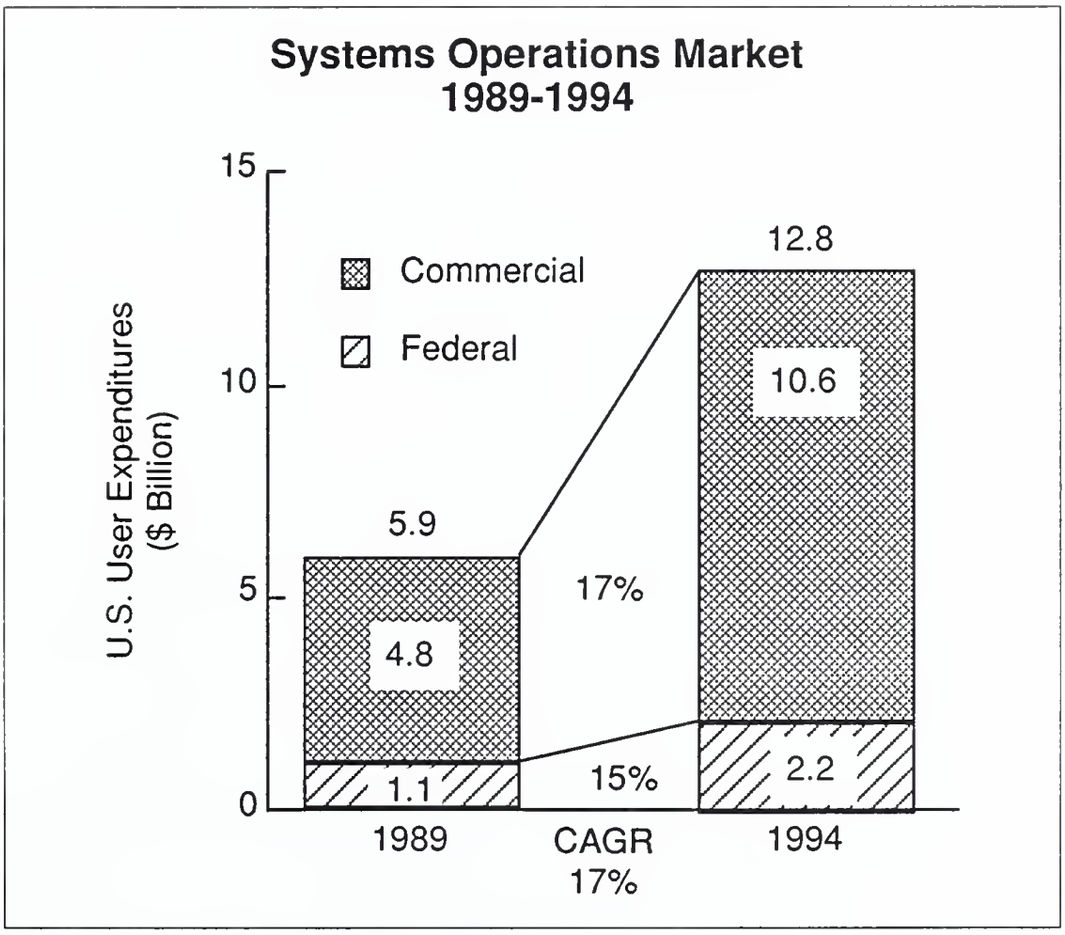
EXHIBIT VII-2



The processing services systems operations market will grow at an 18% compound annual growth rate, as shown in Exhibit VII-3. This growth will be fueled by: user desire for improved service levels, including application maintenance and development; availability of skilled resources; user recognition that applying internal resources to strategic application development impacts profit more than applying them to ongoing operations; and comfort with outsourcing, based on successful systems integration projects.

Systems operations growth has also been fueled by two additional factors: IBM market entry, indicating that it has accepted systems operations as a strategic direction and will include it in its broader equipment and solution strategies; and recognition by the federal government that this service is an important alternative to escalating salaries in the current constrained budget environment. The federal market for systems operations is now forecast to grow at 15% through 1994, almost double the 8% growth rate forecast in 1988.

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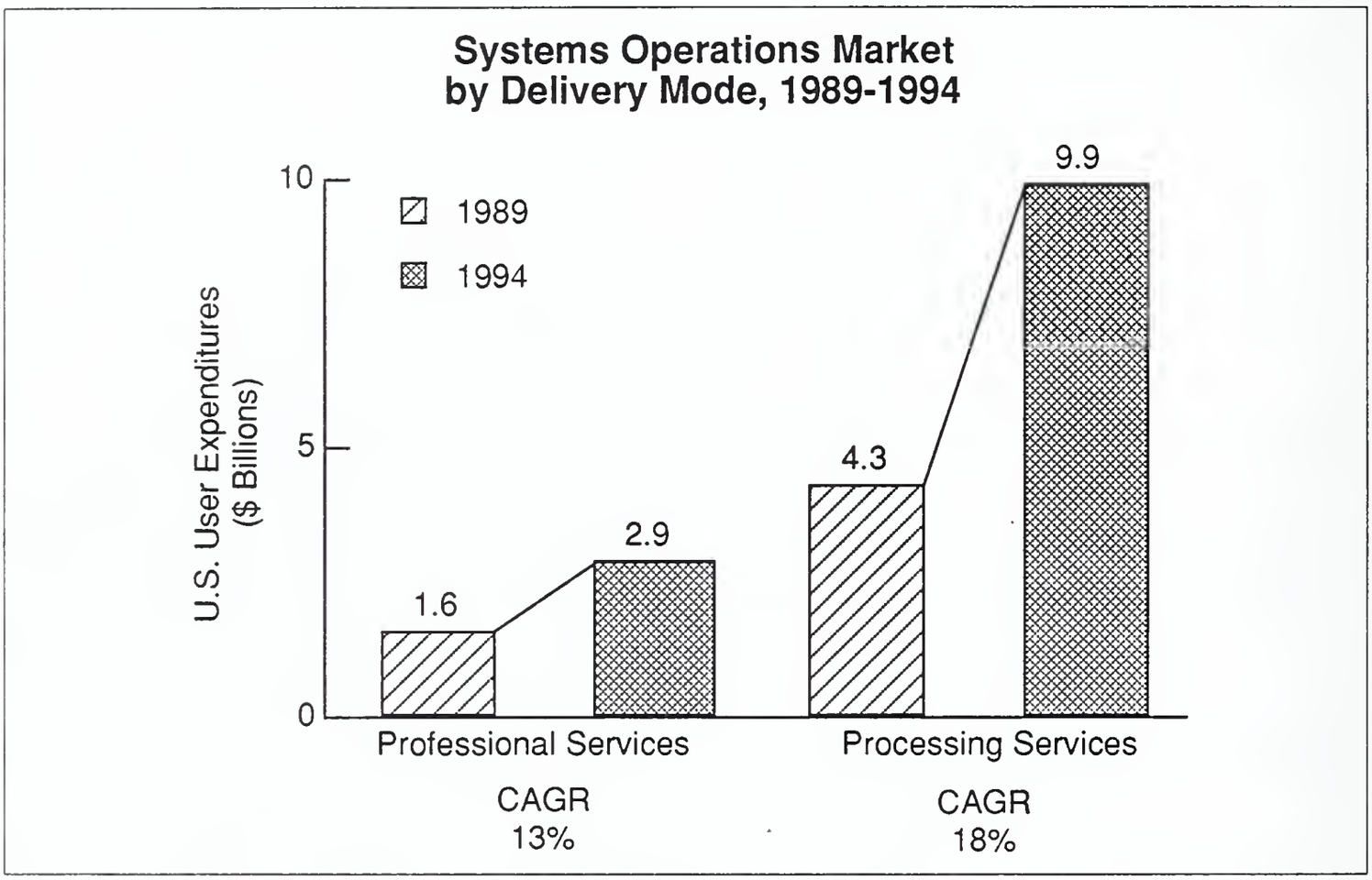
EXHIBIT VII-3



Under the processing services orientation of systems operations, the vendor owns the equipment used in the contract. A second mode of systems operation, the professional services mode, is also available, where the vendor provides staff to plan, manage, control and operate equipment that is owned by the client. User expenditures for this mode were $1.6 billion in 1989, and will grow more slowly, at an annual growth rate of 12%, to $2.9 billion in 1994.

In the commercial market, around 85% of 1989 user expenditures were for the processing services mode of systems operations, which is growing more rapidly than the professional services mode. In the federal government the reverse is true, with the professional services mode preferred, accounting for over 75% of expenditures and growing more rapidly than processing services.

The systems operations market has been traditionally focused on a few vertical industry markets that have inordinate amounts of paper processing and limitations in their ability to hire and retain large numbers of operations personnel. These markets include finance and banking, insurance, medical, state and local government, and the federal government. These industries will provide most of the growth in the systems operations market over the five-year forecast period.

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In examining the market in more detail, there are some major changes in structure that become apparent. Traditionally, facilities management was preferred, with customer-owned computers at the customer's site or vendor-owned computers at the vendor's site, as shown in Exhibit VII-4.

EXHIBIT VII-4

Characteristics of Types of Systems Operations

Location	Ownership	
	Vendor	Customer
Vendor	Processing Services	Professional Services
Customer	Processing Services	Professional Services

Location	Dedication	
	Shared	Single Customer
Vendor	Processing Services	Professional Services
Customer	Processing Services	Professional Services

Dominant modes

Application Provider	Type of Systems Operation	
	Platform	Application
Customer	*	
Systems Operation Vendor		*
Third-Party	*	*

New mode of partnership

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Now there are SO opportunities that cross these bounds, with vendor-owned computers at the customer's site and customer-owned computers at the vendor's site. A further market discriminator is sharing of computers: in customer-owned systems the computers are usually dedicated to the customer's functions; in vendor-owned systems the computers are usually shared with other customers. Again there is some breaking down of these traditional differences.

These changes are arising from the origin of a systems operations contract.

1. When a major systems integration project leads to systems operation, the central computers may be located at the vendor's site when purchased during the installation phase. Rather than transfer them to the customer's site, they may remain in the vendor's data center to be operated by the vendor, yet be owned by the customer. The vendor may then also offer to sell additional work to be operated on the customer's system, thus allowing the owner/customer to obtain revenues to partially offset its costs. This would be a professional services systems operations contract for a shared system at the vendor's site.

2. On the other hand, when a vendor "takes over" an existing data center as part of a systems operations contract, the computer ownership may well be transferred to the vendor, particularly if the vendor buys the entity. However, the computer will stay at the customer's site, at least initially, and be operated solely for that customer. This is a processing services systems operations contract with dedicated computers at the customer's site.

3. In a variation of the last scenario, the customer may retain ownership of the system and the vendor may sell services in that system to other customers. We then have a professional services systems operation contract with shared computers at the customer's site.

The three variables vendors and prospects can work with are therefore:

1. Ownership of systems—central computer equipment and systems software

2. Location of the central systems

3. Degree of dedication —dedicated or shared

There are also two types of systems operation to be considered: platform and application. In the former, the vendor provides the operation of the computer/network system only. The application software is provided by the customer or possibly a third party. There have been several vendors that have provided platform operations successfully for client-owned

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application software, notably Litton Computer Services and Genix. The new development has been the entry of IBM, providing platform operations in combination with an applications software third party (such as Broadway and Seymour in the case of First Tennessee National Corp.). This then moves a platform systems operations vendor into competition with an application vendor such as EDS or Systematics. This development is a crucial one in that it 'unbundles' the components of the application service. It also provides for more choices in the market.

The above discriminations reflect different reasons for approaching a systems operations contract on the buyer's part.

1. Platform systems operations contracts result primarily from buyers' attempts to reduce costs or change operational structure, as in the case of corporate restructuring.

2. Application systems operations contracts typically come from medium-sized organizations that have a need to upgrade their information systems in terms of application software and operations. The new approach of partnering between a platform vendor and an application/ industry specialist opens up the application systems operation market to a new set of competitors.

Vertical industry forecasts for end-user expenditures for processing services systems operations are illustrated in Exhibit VII-5. The identified expenditures are focused in five vertical industry markets, where nearly 85% of end-user spending occurs.

The largest vertical market in 1989, and through 1994, will be the banking and finance industry, which represented over 30% of 1989 user expenditures. The industry is being driven by competition and is operating on narrow margins and limited resources. The growth rate of systems operations in this industry is relatively modest (16% annual growth), as the market is mature and is struggling with problems of the savings and loan crisis.

The insurance and process manufacturing markets' growth is driven by the recognition that many information and administrative processing applications, like claims processing in the insurance industry, are non-strategic and can be easily off-loaded to vendors. State and local governments suffer from many of the same problems as the federal government, and their focus is on getting the job done, not who does it—a perfect setting for systems integrators and systems operators.

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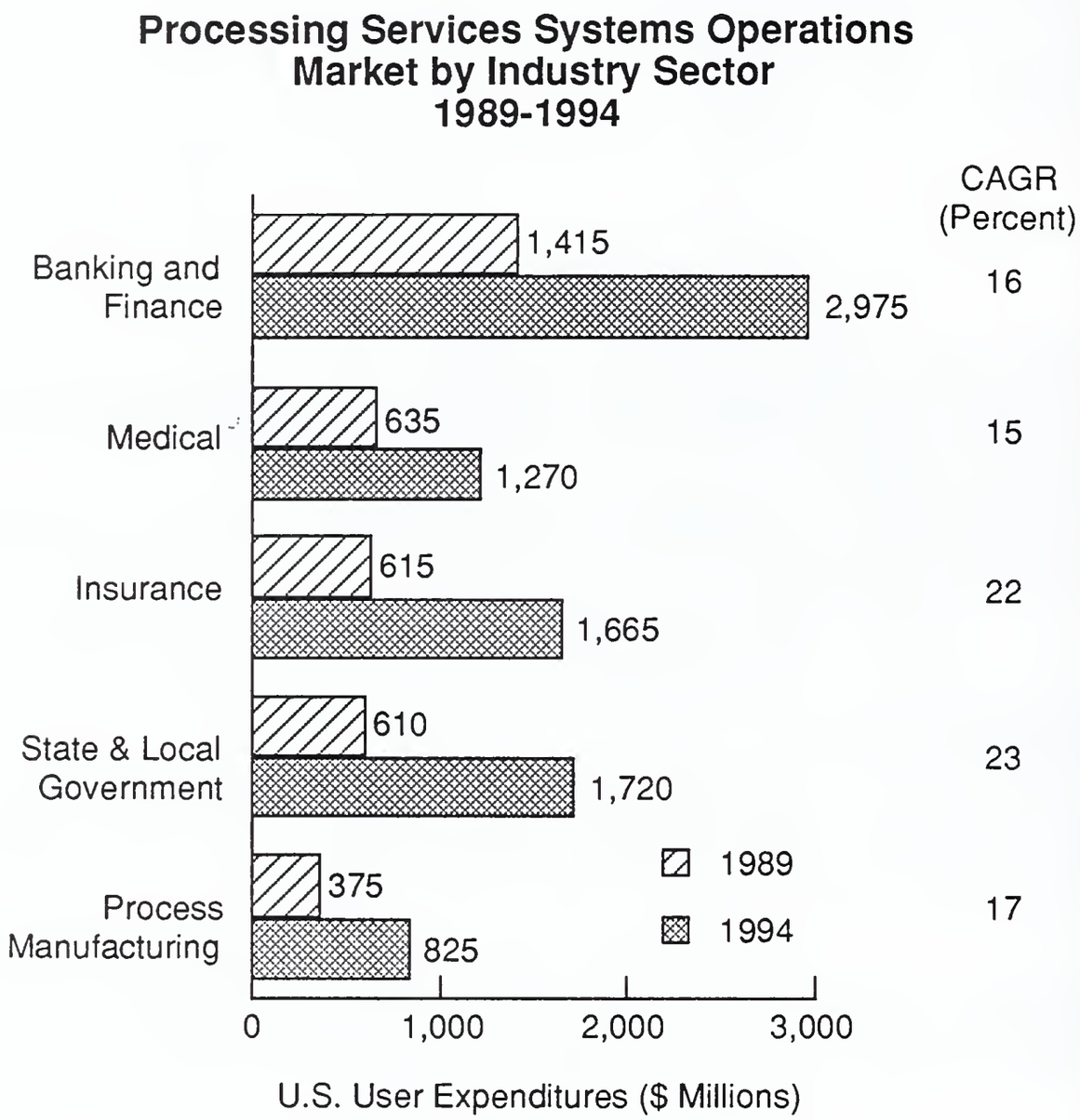
EXHIBIT VII-5



Note: Data rounded

The medical industry depends on information systems to monitor and control patient care, provide administrative and billing support, and satisfy government reporting requirements. The industry is already well-penetrated by systems operations, and growth is hampered by the current fiscal problems of many hospitals. Medium-sized hospitals have moved to turnkey systems solutions in the past few years at the expense of processing services.

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C

Competitive Environment

Systems operations is a market that has been dominated by a few large vendors, including: EDS, Computer Sciences, McDonnell Douglas, Shared Medical Systems, Boeing Computer Services and Systematics. (Sizeable investment for equipment, facilities and, in some cases, application software is required to enter this market. This has limited new entries.) In 1989, however, two additional major vendors, IBM and Andersen Consulting, announced their intent to participate in this market. IBM's entry signals to the user community that systems operations has been accepted by the largest industry vendor in its overall strategic direction. This event, like IBM's entry in the PC market, should increase the acceptance of systems operations by users.

The entry of Andersen Consulting and IBM in this market also emphasizes the evolution to "full service providers" in the information service markets. As the equipment market growth slows and services become a larger portion of the information industry, vendors are expanding their service offerings to capture more of the available revenues. The long-term nature of systems operations contracts allows vendors to "capture" clients and provides a long-term source of recurring revenues.

Several vendor strategies have emerged in the systems operations market. Products and services are blurring in the information services industry; and as they do, vendors are positioning themselves to capture as much of the user IS expenditures as possible. To do this, there is a clear trend for vendors to provide a full range of services, from business consulting through systems operations. Most of the systems operations firms claim to provide system integration services as well as a full range of other information services.

Vendors practice two basic approaches in the systems operations market. Some focus on narrow vertical markets, providing added value through front-end business consulting, quality industry application software packages, and a variety of operating environments.

Other large vendors tend to focus on broad industry coverage, and provide attractively priced services through leveraging equipment and skills in large data centers, or through remote operations.

Systems integration projects create confidence in outsourcing and a relationship that can lead to a long-term operations contract. Successful long-term systems operations contracts establish an environment where it is easier to sell systems integration. Vendors having both capabilities can establish and retain long-term relationships with their clients.

Many vendors, particularly those that understand how to manage and leverage technology and productivity, prefer fixed-price contracts. Investment in technology and advanced operating techniques can result in excellent margins over long contractual periods.

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EDS is the leader in the systems operations market, as shown in Exhibit VII-6, with a 16% market share. EDS' experience in the facilities management business goes back to the mid-1960s, and it has developed a strong set of capabilities that it offers to a broad set of vertical markets. It provides systems integration services as well as professional services and systems operations. EDS has even larger systems operations revenues flowing from its parent, General Motors, which supplies additional operating resources, buying power, and experience that it can leverage to provide low-cost service to noncaptive clients.

EXHIBIT VII-6

Leading Systems Operations Vendors

Vendor	1988 Market Share (Percent)
EDS	*16
Computer Sciences	5
McDonnell Douglas	4
Shared Medical Systems	3
Boeing Computer Services	3
Systematics	3

* Non-GM

Computer Sciences' systems operations have focused primarily on federal and state and local governments and insurance markets. McDonnell Douglas' recent divestitures, including TYMNET and its shared hospital services offering, dropped its market share in 1989, although it still retains systems operations activities focused at transition management and insurance processing. The remaining three vendors in the top six, Shared Medical Systems (SMS), Boeing Computer Services (BCS), and Systematics, have narrower focuses. SMS is focused on the medical industry, Systematics on the banking and finance industry, and Boeing on network management, image and document processing, computer-aided design and manufacturing applications, and the federal government market.

New vendors are moving into the market by building on internal IS organizations. For example, Perot Systems formed a jointly owned company with ICH, a large insurance company. The new company provides systems operations to ICH and to other companies.

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There will be renewed interest in systems operations in the 1990s—it will become one of the hottest information services markets. Users that have employed a systems integrator to develop and implement a system solution will become more comfortable with outsourcing, and will look to systems operations as a viable and economical alternative. Systems operations will become a convenient way to free the in-house staff from operational activities and permit them to focus on developing solutions that will make the organization more competitive and profitable.

Systems operations, similar to systems integration, has been recognized as an important vehicle for gaining and retaining client control. As a result, it is receiving renewed interest and focus from the vendor community. All information services vendors should, as indicated in Exhibit VII-7, consider its impact on their business strategies. Vendors should be able to provide or have access to a full range of service offerings, including systems operations and systems integration. If these capabilities are not available internally, then alliances or partnerships should be established to provide them.

Organizations that are experiencing change, either as a result of mergers or divestitures, or the need to respond to competition, are excellent targets for systems operations. Vendors should focus sales activities on these prospects; establish a systems operations strategy that will leverage existing skills and resources; and not try to break new ground with a system operation strategy that is not synergistic with current organizational focus and capabilities.

Systems operations will be an important information service offering in the 1990's. Vendors should posture their organizations to participate in its growth and profits.

EXHIBIT VII-7

Recommendations

- Include systems operations and systems integration in business strategies
- Focus on full service offering
- Target organizations experiencing change
- Leverage skills and resources

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VII

Vendor Activities and Profiles

VIII

Vendor Activities and Profiles

A

Vendor Activities

ADP, EDS, and Control Data Corp. are three of only six firms to exceed $1 billion in 1989 total information services revenues in the United States. IBM, Digital Equipment, and Unisys are the others; each of the latter group received much larger revenue contributions from other delivery modes, such as software and professional services.

Only four of the top 11 companies shown in Exhibit VIII-1 are still independent.

EXHIBIT VIII-1

Leading Processing Services Vendors

Company Name	1988 U.S. Revenue ($ Millions)
Automatic Data Processing, Inc.	1,125
EDS Corporation (& MTech)	1,060
Mellon Bank	790
Control Data Corp.	560
American Airlines	500
American Express	450
Covia	400
First Financial Management Corp.	400
Shared Medical Systems Corp.	265
McDonnell Douglas Information Systems Group	230

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EDS, American Express and First Financial Management Corp. have particularly aggressive acquisition plans which will move them up the list. EDS should be the largest processing services vendor by the end of 1990.

B

Public Company Performance

Growth for the public processing/network services companies has remained relatively constant during the past five years, ranging between 16% and 17% per year. Earnings growth for this group has fluctuated significantly during the past five years. Earnings grew only 4% in 1988—Telecredit took a $17.9 million loss in the first quarter as it 'wrote off' a subsidiary. Without Telecredit's loss, overall earnings would have grown 8%.

Profitability for the processing/network services group is running slightly above average for the information services industry as a whole. During 1988, the profit margin (after taxes) maintained by the group was 8%, compared to the industry average of 7%.

C

Vendor Profiles

The following companies are profiled in this report:

Automatic Data Processing
Control Data Corporation
Comdisco Disaster Recovery Services, Inc.
Electronic Data Systems Corporation
First Data Resources Inc.
FFMC
Litton Computer Services
National Data Corporation
Paychex, Inc.
Shared Medical Systems Corporation
Systematics, Inc.

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AUTOMATIC DATA PROCESSING, INC.
One ADP Boulevard
Roseland, NJ 07068
(201) 994-5000

Josh S. Weston, Chairman, President, and CEO
Public Corporation, NYSE
Total Employees: 21,000 (6/89)
Total Revenue, Fiscal Year End 6/30/89: $1,677,688,000

The Company

Automatic Data Processing, Inc. (ADP) was formed in 1949 as Automatic Payroll', Inc. Its name was changed to Automatic Data Processing in 1960. From 1949 to 1961, its payroll services were performed on unit record equipment. In 1961 ADP computerized its operations and went public.

Since the early 1960s, ADP has implemented an active acquisition program to diversify from its primary business of providing payroll services. Payroll and accounting services still provide the major share of ADP's revenue; however, significant gains have been made in brokerage, services to automotive dealers, and automotive claims services for automobile insurers and repairers. The company now provides information and processing services to more than 200,000 clients worldwide.

ADP reported revenue of over $1.67 billion in fiscal 1989, an 8% increase over fiscal 1988 revenue of $1.55 billion. Net income rose 10%, from $170 million in fiscal 1988 to $187.6 million in fiscal 1989. A five-year financial summary follows:

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AUTOMATIC DATA PROCESSING, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	6/89	6/88	6/87	6/86	6/85
Revenue	$1,677,688	$1,549,157	$1,384,236	$1,204,246	$1,031,493
• Percent increase from previous year	8%	12%	15%	17%	16%
Income before taxes	$271,800	$254,985	$221,910	$183,500	$154,583
• Percent increase from previous year	7%	15%	21%	19%	16%
Net income	$187,570	$170,300	$132,030	$105,960	$87,600
• Percent increase from previous year	10%	29%	25%	21%	17%
Earnings per share	$2.46	$2.14	$1.68	$1.40	$1.22
• Percent increase from previous year	15%	27%	20%	15%	15%

ADP management attributed the company's continued growth in revenue and earnings primarily to the expansion of its client base and new product offerings.

- Revenue growth for fiscal 1989 was strongest in Employer Services and Dealer Services, which together represented approximately 60% of ADP's total revenue.

- ADP management states that consolidated revenue growth was negatively affected by the impact of soft Wall Street conditions on the company's Brokerage Services business. Reduced trading volume, fewer quote terminals, and price pressures resulted in an approximate 10% revenue decline in Brokerage Services and the business operated at a loss during fiscal 1989.

Systems development and programming expenditures were $86 million (5% of revenue) in fiscal 1989, $72.1 million (5% of revenue) in fiscal 1988, and $55.7 million (4% of revenue) in fiscal 1987.

ADP management predicts modest revenue growth during fiscal 1990 and double-digit growth (10% to 15%) in earnings per share.

- Revenue for the six months ending December 31, 1989 was $414 million, as compared with $409 million for the same

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period in 1988. Net income for the period was nearly $50 million, compared to $44 million for the same period in 1988.

Recent ADP acquisitions include the following:

- In July 1989, ADP acquired Automatic Business Centers, Inc. (ABC) of Moorestown (NJ). ABC is a regional processing company that provides payroll services to approximately 11,000 companies in the Northeast. Terms of the purchase were not disclosed.

ADP has made several divestitures which are expected to reduce fiscal 1990 revenue by approximately 8%:

- In the fourth quarter of fiscal 1989, ADP sold its automated teller business to Electronic Data Systems and its real estate service business to a private company.

  - Cash proceeds from the sales were approximately $93 million and notes receivable totaled $2.5 million, resulting in a non-recurring pretax gain of approximately $66 million for fiscal 1989.

  - These businesses contributed approximately 3% ($50 million) of ADP's annual consolidated revenue.

- During the first quarter of fiscal 1990, ADP sold its banking and thrift processing services business to Welsh, Carson, Anderson & Stowe and its Canadian brokerage quotation service to a private company. These transactions resulted in a pre-tax gain of approximately $48 million.

- In early 1990, ADP sold its Manufacturing Services business to the division's management. This unit provided turnkey systems for manufacturing and financial control applications to small- to medium-sized manufacturers.

ADP's current organization structure is shown in the exhibit. The company is currently organized into six major groups as follows:

- Employer Services, with more than 10,000 employees, provides payroll processing, payroll tax filing, job costing, labor distribution, unemployment compensation management, and personnel information services.

  - Accounting Services (which was formerly included in the Interactive Business Services unit) provides generic accounts

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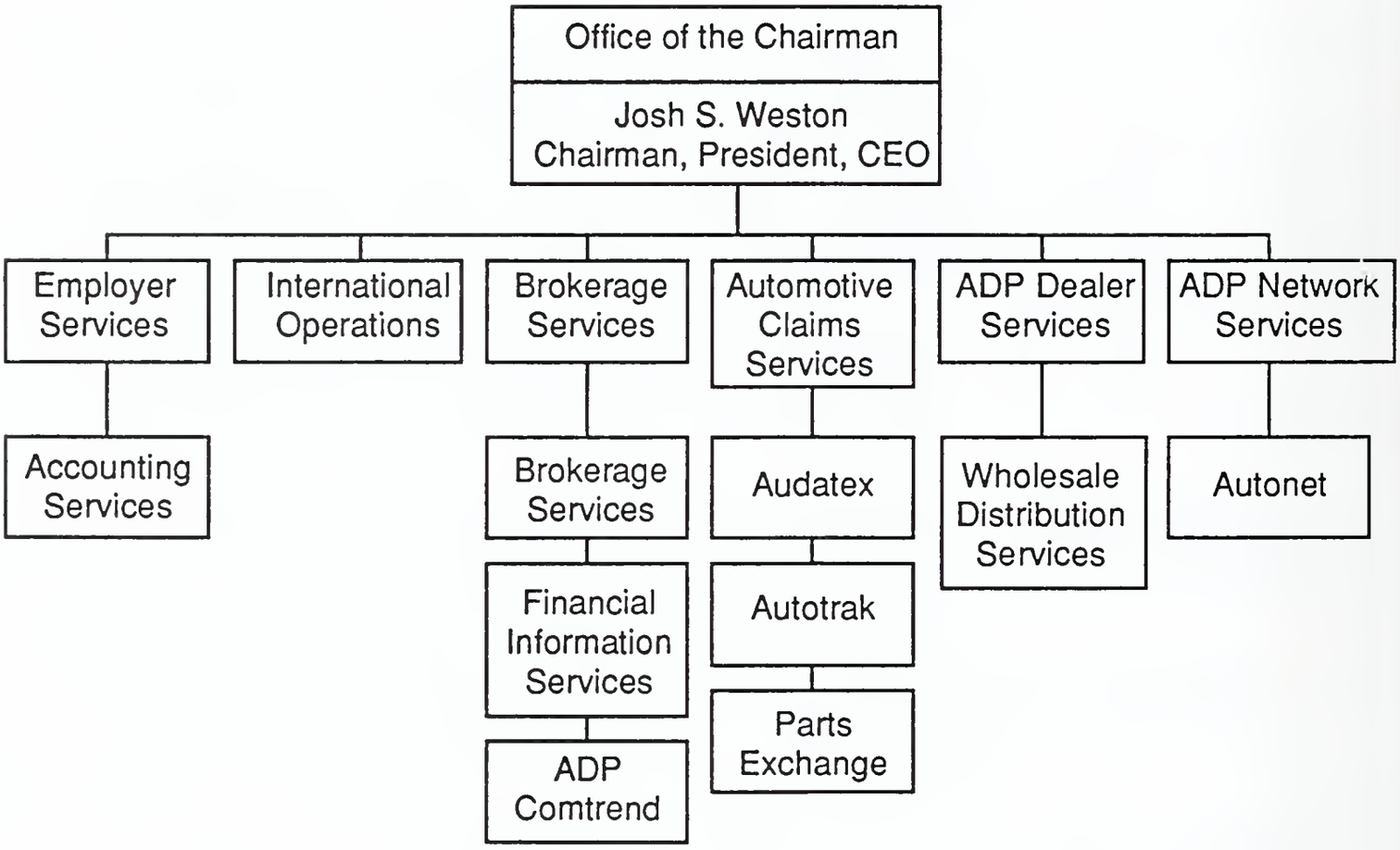
Exhibit

ADP Organization Chart



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receivable, accounts payable, time analysis, and general ledger/financial reporting transaction processing services.

- The Brokerage Services Group includes the following businesses:

  - Brokerage Services provides "back-office" recordkeeping processing services.

  - Financial Information Services provides data base and stock quotation electronic information services to the investment/brokerage industry.

  - ADP Comtrend provides an on-line service for commodity, currency, and interest rate futures trading.

- Automotive Claims Services (formerly Collision Estimating Services) provides claims estimating processing services and electronic information services for vehicle valuation and parts locating and pricing to automobile insurers, manufacturers, and repairers.

- ADP Dealer Services provides processing and network services and turnkey systems to auto, truck, farm, and heavy equipment dealers.

  - Wholesale Distribution Services (which was formerly included in the Interactive Business Services unit) provides turnkey systems for order entry, invoicing, accounting, and inventory services, and other front-end/back-office applications to small- to medium-sized wholesalers and distributors.

- ADP Network Services provides remote computing and on-site distributed processing services and packet switched value-added public data network services.

Key Products and Services

INPUT estimates ADP's fiscal 1989 revenue was derived approximately as follows:

Processing services	75%
Network services	13%
Turnkey systems	12%
	100%

A three-year summary of ADP's source of revenue by major operating group, as estimated by INPUT follows:

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AUTOMATIC DATA PROCESSING, INC.
THREE-YEAR SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	6/89		6/88		6/87	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Employer Services	$840	50%	$734	47%	$623	45%
Financial/Brokerage Services (a)	434	26%	424	27%	402	29%
Dealer Services	190	11%	163	11%	138	10%
Automotive Claims Services	80	5%	73	5%	69	5%
Interactive Business Services (b)	94	6%	103	7%	97	7%
Network Services	40	2%	52	3%	55	4%
TOTAL	**$1,678**	**100%**	**$1,549**	**100%**	**1,384**	**100%**

(a) Includes revenue from businesses divested during 1989, including automated teller, real estate, and banking and thrift services. Brokerage Services revenue was an estimated $335 million (20% of revenue) in fiscal 1989, compared to $375 million (25% of revenue) in fiscal 1988.

(b) Includes revenue from Accounting Services and Wholesale Distribution Services, which now report to separate units, and Manufacturing Services, which was sold in early 1990.

Employer Services are provided to clients engaged in a wide variety of businesses. In addition to marketing its services directly, ADP has marketing relationships with many banks and CPAs whereby ADP offers its services to their clients and prospective clients. Employer services are offered from ADP's regional centers located throughout the U.S. ADP also has data processing centers in Western Europe, Brazil, and Canada. On payday, ADP pays 11 million workers, representing an estimated 10% of the U.S. workforce.

- Employer services include payroll processing and related payroll tax filing, personnel recordkeeping and reporting, unemployment compensation management, and specialized management reports to over 200,000 clients.

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- ADP's payroll services are its largest single form of service and are provided from over 40 regional processing centers in the U.S. and from centers in London, Rotterdam, Campinas, San Paulo, Rio de Janeiro, Toronto, and Montreal.

- ADP's payroll services include automatic deposit, quarterly and annual social security and income tax withholding reports, W-2 withholding statements for employees, a complete record of payments for each pay period, and periodic employee historic earnings records. Also included are special statistical and audit reports for management, such as payroll and job cost distribution reports, welfare and pension fund reports, and payroll audit reports.

- Autopay I Payroll service targets small clients with 5 to 19 employees.

- ADP's Autopay II payroll service focuses on companies with 25 to 500 employees. ADP has over 100,000 clients in this segment.

- Autopay Plus, introduced in 1983, includes an integrated payroll and tax filing service for companies with fewer than 25 employees.

- The National Accounts Division sells payroll services to companies with over 500 employees.

- ADP's automated payroll tax impound and filing service processes and remits federal, state, and local payroll withholding taxes. Currently, more than half of ADP's payroll clients use ADP's tax filing service.

- ADP's interactive personnel recordkeeping and reporting systems, operating in conjunction with the payroll data base, provide salary, benefits, and EEO compliance reports and various other information needs for personnel administration.

- Unemployment compensation management services are also offered in conjunction with ADP's payroll services and are designed to aid in the management and reduction of unemployment insurance costs. The service handles claims processing, monitors state changes against the employer's accounts, aids clients in appeals, reviews prior employment history, evaluates current tax rates, and analyzes the client's various financial options.

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- The Interactive Payroll and Personnel (IPP) Service, is an on-line processing service targeted primarily to companies with more than 500 employees and multiple locations.

  - Personnel and payroll data are entered on a terminal supplied by ADP or a microcomputer. The terminal is linked to a regional ADP computing center via Autonet.

  - The IPP system provides automatic updates of personnel files adjusted to reflect payroll activity.

  - The system provides a range of payroll-related services, including filing of federal, state, and local taxes, unemployment cost control, and various management reports, printed on-site.

- Over 35,000 ADP payroll clients now use microcomputers for payroll input to ADP. This PC-Payroll service (formerly called PC-Connection) is targeted to accounts with 50 or more employees. In late 1989, ADP introduced Easypay, a simplified PC service for smaller payroll clients.

- HR Partner, to be introduced in pilot mode in April 1990, is a service that enables a client to integrate personnel records and payroll information for use by both payroll and human resource managers.

- ADP continues to provide generic accounts receivable, accounts payable, time analysis, general ledger, and financial reporting services to 10,000 to 20,000 businesses. This client base now has the option to use client-site PCs connected to ADP's regional centers' mainframe systems.

ADP's Brokerage Services business includes the following products and services:

- Back-office stock brokerage and related financial transaction processing services include brokerage processing, cage management, stock loan accounting, on-line inquiry and data collection, portfolio reporting, order matching, and on-line trading. ADP also provides processing services to brokers and traders in commodity contracts, commodity futures, and options. These services are offered in the U.S. and Canada. During fiscal 1989, ADP consolidated its back-office processing services into an operations center in Jersey City (NJ).

- Front-office data base and quotation electronic information services, provided by ADP to the investment and brokerage

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community, include supplying quotations, financial news, and other information to terminals located on brokers' desks.

- ADP now has over 55,000 traditional quotation terminals in worldwide use by more than 1,000 clients. In August 1989, ADP transferred the hardware maintenance function for these terminals to IBM. In addition, there are over 7,000 new micro-based workstations in over 300 client sites. During fiscal 1989, ADP consolidated its front-office and quote operations into a data center in Mt. Laurel (NJ).

- ADP's stock quote and branch automation service, FS-Partner, is an IBM PS/2-based service that links microcomputers with various stock exchanges, ADP computers, and client computers to provide market data and proprietary brokerage and management information applications for the front office. FS-Partner is currently being installed in Merrill Lynch and Shearson Lehman Hutton offices under contracts awarded to ADP during calendar 1987.

• ADP Comtrend provides predominantly on-line, real-time services for all active commodities, currencies, and interest rate futures trading.

- Comtrend's Videcom[R] Financial Information Service provides quotations by telecommunications lines and satellite broadcast, and presents the futures data through a terminal which graphically displays price and volume movements in each futures contract.

- Comtrend provides its services to subscribers in the U.S., Europe, and Hong Kong.

ADP Automotive Claims Services (ACS) provides computerized estimating services to auto insurers and repairers in the U.S. and Canada related to auto collision repair and valuation.

• ACS has three main product lines as follows:

- Audatex is an on-line collision repair estimating service. The system links 2,500 client-site terminals and about 2,500 claims adjusters' portable terminals to ADP's proprietary data base in Ann Arbor (MI). The data base contains cost and labor hours information on repairing and replacing parts for virtually all models of autos and trucks produced since 1970.

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- AutoTrak is a valuation service for cars and trucks used by insurance companies to determine a fair replacement price on vehicles that are a total loss. Autotrak valuations are produced from a computerized data base with pricing information on about three million used cars that have been recently advertised by car owners or dealers.

- Parts Exchange is an automated parts locating and pricing service provided to insurers, manufacturers, distributors, and repair shops. The service offers data, including comparative costs, location, and availability, on more than 900,000 parts.

- The division is a major user of ADP's Autonet network for data communications between insurance company claim centers and ADP's data base of auto parts and repair-labor information.

- During 1989, ACS began testing a PC-based mobile data entry, editing, printing, and communication terminal for use by mobile claims adjusters when estimating repair costs in remote locations. General availability is scheduled for the spring of 1990.

- ACS also offers a tele-estimating service for remote adjusters in low-volume locations.

- Eighteen of the 20 largest auto insurance companies in North America are ACS clients.

ADP Dealer Services provides network services and turnkey systems to over 6,500 auto, truck, farm, and heavy equipment dealers throughout the U.S. and Canada. Client retention reached 95% in fiscal 1989.

- Applications available include inventory control, general accounting control, lease management, parts invoicing, service merchandising, finance and insurance control, repair order billing, accounts payable, check-writing, and word processing.

- ADP's on-site system for franchised dealers is offered on a Microdata minicomputer. It can operate as a standalone system or be used on a shared basis.

- ADP's Manufacturer-Dealer Communications Service uses an on-site computer to link manufacturers with their dealers for ordering, warranty claims processing, delivery reporting, pricing updates, and vehicle locating. These dealerships can also use the service for other processing functions such as financial reporting and inventory management.

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- New services introduced during fiscal 1989 include the following:

  - Automated Parts Cataloging (APC) provides digitized computer disc storage of "how to" parts catalogs from several auto manufacturers.

  - Electronic Repair Orders (ERO) integrates repair shop scheduling, parts ordering, and customer billing functions.

- Wholesale Distribution Services, formerly part of ADP's Interactive Business Services unit, provides Distribution 2000™, a minicomputer-based turnkey system targeted to the wholesale distribution industry. Distribution 2000 supports front office order entry, back office accounting, purchase order, and inventory management. A specialized service group works with these clients, whose annual sales typically range between $2 million and $100 million.

ADP Network Services provides both general and specialized management-oriented on-line services, primarily to major corporations, large financial institutions, and government organizations in the U.S. and Western Europe.

- ADP Network Services also maintains ADP's Autonet packet-switched teleprocessing network. Autonet's prime function is to aid other ADP divisions with more efficient data communications.

- Treasury Management (CashExpress) is Network Services' leading industry-specific service. It permits banks throughout the world to provide corporate treasurers with instant access to current deposit and account information.

  - The CashExpress Workstation is a low-cost, microcomputer-based cash management system designed to run on the IBM PC/XT. The system uses the MDBS III data base management system for rapid data access from ADP's mainframe computers, and includes the Lotus 1-2-3 spreadsheet software for development of forecasts, charts, and graphs in preformatted programs or user-customized formats.

  - Applications are available for MIS, deposit, and balance reporting; cash analysis; bank relationships management; funds transfer; and related services.

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- Currently, over 9,000 corporate clients obtain these services through more than 130 ADP sponsor banks.

- ADP Network Services also offers the APECS/8000 project management turnkey system based on DEC MicroVAX II and AT&T 3B-series computers. APECS/8000 is also available on ADP's network.

Industry Markets

ADP's revenue is primarily derived from various businesses, banks, and CPAs for payroll and related services; automotive dealers and manufacturers; brokerage firms; and insurance companies.

Geographic Markets

Approximately 95% of ADP's revenue is derived from U.S. operations, with the remainder from the United Kingdom, Western Europe, Canada, and Brazil.

- Combined revenue from Canadian business, ADP's largest foreign market, reached nearly $50 million in fiscal 1989.

- Revenue from Brazil increased 20% over fiscal 1988 levels. However, profit growth was negatively impacted by inflation.

Computer Hardware

ADP uses more than 100 mainframes (excluding minicomputers) in its various data centers.

- ADP Network Services maintains its primary data center in Ann Arbor (MI). Equipment used to provide network services includes a large number of DEC System 10s and 20s and DEC VAXs.

- Employer and Accounting Services maintains about 45 data centers in various locations in the U.S. and Europe. Computer equipment installed is predominantly IBM 4300 systems and Magnuson mainframes.

- Brokerage Services maintains operations ce ters in Mt. Laurel and Jersey City (NJ) using primarily IBM, DEC, and Amdahl systems. ADP Comtrend uses a data center in Stamford (CT).

- Dealer Services' primary data center, located in Schaumberg (IL), uses Microdata computers.

- Automotive Claims Services uses the Network Services data center in Ann Arbor to provide services to its clients.

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CONTROL DATA CORPORATION
8100 34th Avenue South
Minneapolis, MN 55440
(612) 853-8100

Robert M. Price, Chairman and CEO
Lawrence Perlman, President and COO
Public Corporation, NYSE
Total Employees: 30,000 (6/89)
Total Revenue, Fiscal Year End 12/31/88: $3,628,300,000
Total Information Services Revenue: $1.1 billion*

*INPUT estimate

The Company

Control Data Corporation (CDC) provides computer hardware and associated maintenance services and a range of information services for business, scientific, and engineering applications to clients worldwide. Information services provided by CDC, which contributed an estimated $1.1 billion to total revenue in 1988, include processing services, software products, professional and systems integration services, and turnkey systems.

Poor performances and liquidity pressures in 1984 and 1985 underscored the fact that, over the course of many years, CDC had become far too diverse. During 1986, CDC management established a restructuring program based on the following basic strategies:

- To refocus its business from a broad diversity of products and services to those businesses in which the company has adequate size and future opportunity to achieve success with available resources.
- To move CDC from a product orientation to a market orientation.
- To make investments and expenditures necessary to develop new products and services that are competitively advantaged.
- To underpin the investment in competitively advantaged products and services with a commitment to quality, implemented by CDC's Total Quality Management Process (TQMP).

As a part of the restructuring begun in 1986, CDC has sold or closed nearly 20 businesses or product lines, including the following:

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- During 1986, CDC sold Trinet, Inc. to a group of investors led by the venture capital group of Welsh, Carson, Anderson & Stowe.

  - Trinet, headquartered in Parsippany (NJ), operated within CDC's Information Services Group, providing data base services related to business information and telemarketing consulting services.

- Also during 1986, CDC sold Communications Solutions, Inc. (CSI) to Altos Computer Systems.

  - CSI, which operated within CDC's Information Services Group, provided a range of IBM-compatible communications software products.

- In October 1986, Commercial Credit Company, CDC's wholly owned financial services subsidiary, became a publicly owned company headed by Sanford Weill. CDC initially retained a 18.3% interest in Commercial Credit, but sold it to Commercial Credit in late 1987. Net proceeds from the 1986 and 1987 transactions totaled $837.5 million.

- In April 1987, CDC sold ARBAT Consultants Ltd to Winter Partners Holding AG of Zurich (Switzerland).

  - ARBAT specialized in DEC software for banking applications and provided processing services, facilities management, and consulting services.

- During 1987, CDC sold its Healthcare Services division to 3M.

  - The division, headquartered in Minneapolis (MN), operated within CDC's Information Services Group, providing application software products and turnkey systems to over 200 medical industry clients.

- In December 1988, CDC sold its Scientific Information Systems (SIS) division to Power Computing Company, a unit of Babcock & Wilcox.

  - SIS, which operated within CDC's Computer Products Group, provided remote data processing services for scientific and engineering applications.

- In March 1989, CDC sold its Control Data Institutes (which provide vocational computer career training) in West Germany and France to Autralian-based Computer Power Group Ltd.

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- In April 1989, CDC announced a $490 million restructuring plan which included the following actions:

  - CDC streamlined its Computer Products Group and has focused the group's business on providing high-performance computing products for engineering and scientific users, particularly in government and the automotive and aerospace industries, and tools to manage data in integrated computing environments. In addition to offering its CYBER workstations and mainframes, Computer Products has an OEM agreement with Silicon Graphics and joint marketing agreements with Convex and Cray Research.

  - CDC discontinued its ETA Systems supercomputer operation. Although ETA achieved a number of technological successes, it had sustained significant losses (estimated at $100 million during 1988 alone) and was not expected to be profitable in the the near future.

  - As a result of the streamlining of its mainframe business, discontinuing ETA, and reducing corporate staff, CDC cut a total of 3,100, or 9.1%, of its worldwide workforce.

- In May 1989, CDC sold Action Data Services to Primerica Corporation.

  - Action Data Services, which operated within CDC's Information Services Group, provides on-line, real-time processing and support products to consumer credit companies and other financial service institutions in the U.S. and Canada.

  - Action Data Services had estimated revenue of $23 million in 1988.

- In June 1989, CDC sold its Control Data Institutes in the U.S. and Canada, as well as the Institute for Advanced Technology, to Minneapolis-based Human Capital Corporation. The two education units serve approximately 18,000 attendees annually.

- In June 1989, CDC agreed to sell Imprimis Technology Incorporated, its disk drive subsidiary, to Seagate Technology for approximately $450 million in cash and securities. When the sale of Imprimis to Seagate is complete, CDC will have approximately an 18% interest in the combined companies.

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- Imprimis, with approximately 8,500 employees worldwide, was formed in September 1988 when CDC established its Data Storage Products Group as a separate subsidiary, allowing it to operate more autonomously.

- While Imprimis has become a major profit and cash contributor to CDC, the technology and business cycle demands of the OEM disk drive industry it must respond to are significantly different from that of other CDC businesses.

- For CDC, the transaction means a potential reduction in debt, additional cash for working capital, an ongoing investment in the OEM disk drive business, and the opportunity to concentrate the company's efforts and resources on the growth of its systems and services businesses.

• In June 1989, CDC sold its European third-party computer maintenance business to Thomainfor, a subsidiary of Thomson-CSF of France. Maintenance of CDC's CYBER product line in Europe will continue to be performed by CDC.

• In July 1989, CDC signed a letter of intent to sell the remainder of its Training and Education business (including PLATO-based products) to Chicago-based William R. Roach & Associates. CDC will retain a 20% interest in the new company William R. Roach & Associates is forming.

Acquisitions made by CDC include the following:

• In December 1986, CDC purchased Broadcast Advertisers Reports, Inc. (BAR) and its wholly owned subsidiary, Radio/TV Reports, Inc. (RTV) for $58.5 million.

- BAR monitors television and radio commercials and compiles advertising rate information. RTV provides photo boards and television and radio transcripts for the advertising and public relations industries.

- The operations of BAR have been merged into Arbitron.

• In December 1987, CDC purchased SAMI/Burke, Inc., a market research firm that tracks consumer product purchases, from TIME Incorporated for $60 million in cash plus future payments based on SAMI/Burke revenue growth during the years 1991 through 1994.

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- SAMI has subsequently become part of Arbitron to enable the combined operations to integrate information about what products Americans buy with data about what media are influencing their decisions.

- CDC sold the Burke custom research business to Burke's managers in July 1989.

- During 1987, CDC acquired the remaining 51% equity interest in VTC Incorporated, a manufacturer of high-performance integrated circuits. VTC now operates as a wholly owned subsidiary of CDC.

- In April 1988, CDC acquired a 20% interest in Silicon Graphics, Inc. for $68.9 million. Silicon Graphics' workstation products include 3D graphics workstations which are the basis of CDC's CYBER 910 workstations.

- In April 1988, CDC increased its interest in Micrognosis, Inc., ultimately owning 100% of the financial information services company.

CDC finished 1988 with revenue of $3.6 billion. As a result of asset sales and write-offs, it expects to be a $2 billion company in 1990.

- CDC management states that, "once known almost entirely for its hardware, soon the company's computer-based services and systems integration businesses will account for over 60% of its revenues."

- A five-year financial summary follows:

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CONTROL DATA CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$3,628.3	$3,366.5	$3,346.7	$3,679.7	$3,692.6
• Percent increase (decrease) from previous year	8%	1%	(9%)	--	8%
Income (loss) before taxes and other items (a)	$16.4	$57.4	$(280.6)	$(484.0)	$(50.0)
• Percent increase (decrease) from previous year	(71%)	120%	42%	(868%)	(126%)
Net income (loss) (b)	$1.7 (c)	$19.3 (d)	$(264.5)	$(567.5)	$5.1
• Percent increase (decrease) from previous year	(91%)	107%	53%	*	(97%)
Earnings (loss) per share	$0.03	$0.45	$(6.48)	$(14.56)	$0.12
• Percent increase (decrease) from previous year	(93%)	107%	55%	*	(97%)

* *Percent change exceeds 1,000%.*

(a) *Includes operations and investment restructure charges (credits) of $(5.6) million for 1988, $(107.6) million for 1987, $162.2 million for 1986, $274.8 million for 1985, and $130.2 million for 1984. Restructure amounts include gains of $4 million in 1988 and $1366.2 million in 1987 and a loss of $6.9 million in 1986 form the disposition of the CDC's interest in Commercial Credit Company.*

(b) *Includes net earnings (losses) from Commercial Credit of $3.5 million in 1987, $42.6 million in 1986, $(4.8) million in 1985, and $49.6 million in 1985.*

(c) *Includes a charge of $400,000 resulting from the cumulative effect as of the beginning of the year of the adoption of FAS No. 96, a new standard for income taxes, in the fourth quarter of 1988.*

(e) *Includes a loss of $6.5 million from early retirement of debt, less a benefit of $800,000 from utilization of international tax loss carryforwards.*

CDC management states that in 1985, most of the company's businesses were losing money. Today, as a result of the strategies implemented for the past several years, approximately two-thirds of CDC's revenues are from businesses that are operating profitably.

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Revenue for the six months ending June 30, 1989 was $1,647.8 million, compared to revenue of $1,853.9 million for the same period in 1988. Net losses were $493.8 million, compared to net earnings of $16.9 million for the same period a year ago.

- The $493.8 million loss includes restructuring charges of $476 million ($493.8 million of charges offset by a restructing gain of $17.8 million from the second quarter sale of Action Data Services). The restructuring charges, as mentioned earlier, included provisions for the discontinance of ETA, the restructuring and downsizing of Computer Products' operations, and the reduction of corporate staff

- Second quarter results before restructure charges primarily reflected losses in Computer Products and VTC that were partially offset by profits achieved by Imprimis, Information Services, and Energy Management. Government Systems also reported a small loss.

Today, CDC is beginning to emphasize its businesses as standalone units, each having its own identity, market, and responsibility for building competitive advantage. CDC's current organization is shown in the exhibit and is summarized as follows:

Control Data Information Services Group:

- The Arbitron Company, headquartered in New York (NY), measures TV and radio audiences, tracks consumer product sales, and integrates TV ratings and product purchase information for advertisers and broadcasters.

- Business Management Services (formerly Control Data Business Centers), headquartered in Bloomington (MN), provides payroll processing and tax filing services, human resources management systems, accounting services, and benefit claims services to over 30,000 organizations nationwide.

- Micrognosis, Inc., headquartered in Danbury (CT), provides automated trading room turnkey systems that consolidate financial information for banks, securities firms, insurance companies, and corporate treasury departments. This unit has approximately 200 customers.

- Ticketron, headquartered in New York (NY), provides on-line processing services to state lotteries, off-track betting systems, and supplies computerized ticketing systems that link consumers with sports and other entertainment events.

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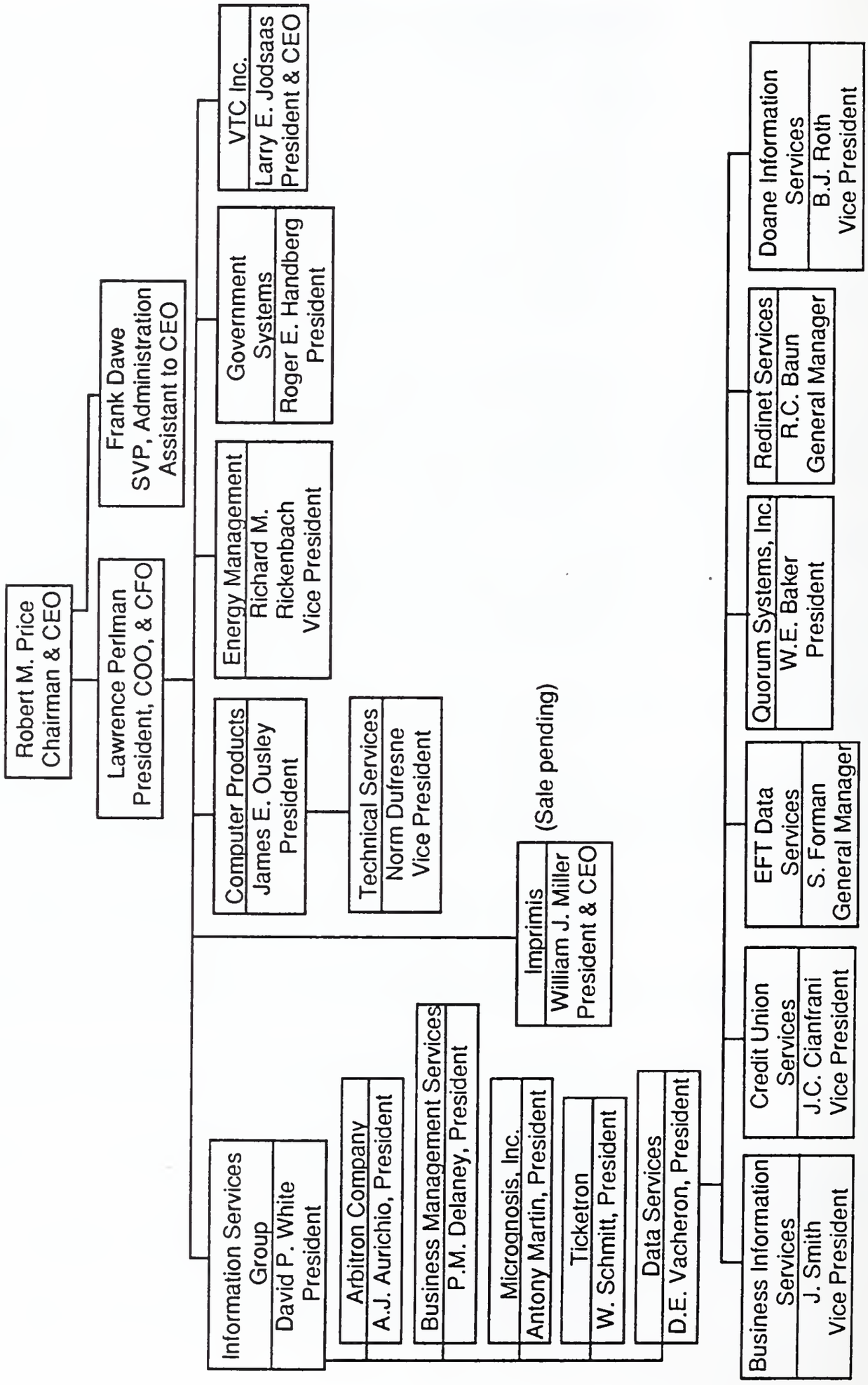
EXHIBIT
Control Data Corporation



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- Data Services includes the following six business units:

  - Business Information Services (BIS), headquartered in Greenwich (CT), provides decision support software products and processing services to clients in the transportation, hospitality, insurance, and banking and finance industries.

  - Credit Union Services, headquartered in Campbell (CA), provides processing services and turnkey systems to credit unions across the U.S.

  - EFT Data Services, headquartered in New York (NY), provides processing services for check and credit card authorizations.

  - Quorum Systems, Inc., headquartered in Plymouth Meeting (PA), provides processing services, software products, and turnkey systems to over 400 law firms and corporate legal departments for financial management, accounting, word processing, and litigation support.

  - REDINET Services, headquartered in Greenwich (CT), provides electronic data interchange (EDI) services.

  - Doane Information Services, headquartered in Bloomington (MN), provides application software products to the agricultural industry.

Computer Products:

Computer Products provides and integrates high-performance computer-based solutions and services for scientific, engineering, and complex information management markets. Its high-performance computers include CYBER 910 workstations and the CYBER 900 family of mainframes.

- Computer Products' Technical Services unit provides maintenance services for products manufactured by CDC worldwide and other computer manufacturers in the U.S.

Energy Management:

Headquartered in Plymouth (MN), Energy Management integrates large systems for electric utilities that manage and control the generation, transmission, and distribution of electric power.

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Government Systems:

Headquartered in Bloomington (MN), Government Systems supplies computer systems, hardware, software, and related services to the U.S. Department of Defense (DoD), the National Aeronautics and Space Administration (NASA), and similiar agencies of U.S. allies. Government Systems is also a prime contractor and systems integrator. Government Systems currently has approximately 800 contracts in force.

VTC Incorporated:

VTC Incorporated, a CDC subsidiary headquartered in Bloomington (MN), develops, manufactures, and markets high-performance integrated circuits using CMOS and bipolar technologies. It serves CDC Computer Products, Government Systems, and the worldwide merchant market.

Marketing agreements announced by CDC include the following:

- In June 1989, CDC announced that it will sell Convex Computer Corporation's C series supercomputers. The agreement will make CDC the exclusive distributor in some non-U.S. markets. Domestically, CDC will be the prime systems integrator in CYBER mainframe/C series installations in some vertical and geographic markets.

- In May 1989, CDC announced a joint marketing agreement with Cray Research, Inc. under which CDC will "have access to a broader base of customers with large or complex computing needs and be able to offer customers alternatives that help them meet their supercomputing requirements."

As of December 31, 1988, CDC had approximately 33,500 employees. The company currently has approximately 30,000 employees, including 8,500 from Imprimis (whose sale is still pending).

CDC information services competitors include the following:

- General and business processing services: Interactive Data Corporation (Dun & Bradstreet), McDonnell Douglas Information Systems Company, ADP Network Services, Infonet, and GE Information Services.

- Engineering and scientific products: GE Information Services, McDonnell Douglas Information Systems Company, and Boeing Computer Services.

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- Computer integrated manufacturing products and services: IBM, Computervision/Prime, Intergraph, Calma (Prime), and Applicon.
- Ticket reservation services: TicketMaster, Datatec, Ticketworld, BASS, and Select a Seat.
- Automated wagering: GTECH, Bally, and General Instruments.
- Energy management systems integration: Ferranti, Landis and Gyr Systems, Inc., and Harris.
- Government systems integration: the top ten defense contractors.

Key Products and Services

A three-year summary of source of revenue, as provided by CDC, follows:

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CONTROL DATA CORPORATION
THREE-YEAR SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	1988		1987		1986	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Computer Systems & Services (a)	$1,198.8	33%	$1,314.4	39%	$1,293.2	38%
Imprimis/Data Storage Products	1,146.0	32%	974.5	29%	1,045.6	31%
Information Services Group						
- Business Services (b)	715.9	20%	514.3	15%	445.6	13%
- Ticketron	129.3	3%	122.8	4%	122.0	4%
- Training and Education	64.3	2%	61.1	2%	95.7	3%
Subtotal	909.5	25%	698.2	21%	663.3	20%
Government Systems	339.1	9%	354.4	10%	341.6	10%
Other (c)	34.9	1%	25.0	1%	13.0	--
TOTAL	**$3,628.3**	**100%**	**$3,366.5**	**100%**	**$3,346.7**	**100%**

(a) Includes CYBER systems, ETA Systems, Technical Services, Energy Management, computer-integrated manufacturing products, and SIS remote computing services.

(b) Includes Arbitron, Business Management Services, Micrognosis, Data Services, and Action Data Services.

(c) Primarily VTC.

INPUT estimates that of CDC's $3.6 billion in 1988 revenue, approximately $1.1 billion was derived from its various information services activities, including the operations of the Information Services Group, the systems integration business of Energy Management and Government Systems, computer-integrated manufacturing products and services, and SIS processing. A further breakdown of CDC's worldwide information services revenue for 1988 is estimated as follows:

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Processing/network services	58%
Systems integration	16%
Turnkey systems	11%
Software products	8%
Professional services (including education and training)	7%
	100%

CDC states that approximately 80% (over $570 million) of its Business Services' revenue is derived from Arbitron, Micrognosis, and Business Management Services.

In spite of the divesture of several information services businesses late in 1988 and during 1989 (as previously described), it is estimated that CDC's 1989 information services revenue will approximate $1.1 billion. The expansion of Arbitron, together with increased revenue in the systems integration and payroll processing businesses, will contribute to information services revenue growth during 1989.

Industry Markets

Revenues from various U.S. government agencies were approximately $406 million (11% of revenue) in 1988, $470 million (14% of revenue) in 1987, and $491 million (15% of revenue) in 1986.

Information services clients include advertisers and broadcasters, financial services firms (including banks, securities firms, insurance companies, and credit unions), corporate treasury departments, federal and state governments, electric utilities, manufacturers, distributors, general businesses, hotels, airlines, legal firms and corporate legal departments, farmers, and consumers.

Geographic Markets

A three-year summary of source of revenue follows:

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CONTROL DATA CORPORATION
THREE-YEAR GEOGRAPHIC SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	1988		1987		1986	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
U.S.	$3,088.3	85%	$2,692.8	80%	$2,723.2	81%
International	1,083.0	30%	1,188.2	35%	1,087.5	32%
(Eliminations)	(543.0)	(15%)	(514.5)	(15%)	(464.0)	(13%)
TOTAL	**$3,628.3**	**100%**	**$3,366.5**	**100%**	**$3,346.7**	**100%**

An estimated 85% of CDC's 1988 information services revenue was derived from the U.S. and 15% from international sources.

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COMDISCO DISASTER RECOVERY SERVICES, INC.
6400 Shafer Court
Rosemont, IL 60018
(312) 698-3000

Raymond R. Hipp, President
Wholly Owned Subsidiary of
Comdisco, Inc.
Total Employees: 300
Total Revenue, Fiscal Year End
9/30/88: $55,500,000

The Company

Comdisco Disaster Recovery Services, Inc. (CDRS), founded in 1980, provides disaster recovery processing and associated consulting services to subscribers in the U.S., Canada, and the U.K.

- CDRS' parent, Comdisco, Inc., leases and remarkets IBM computers and other high technology equipment. Comdisco had revenue of $1.3 billion and net income of $17 million for fiscal 1988.

CDRS' fiscal 1988 revenue reached $55.5 million, a 41% increase over fiscal 1987 revenue of $39.3 million. Pre-tax earnings rose 18%, from $10.1 million in fiscal 1987 to $11.9 million in fiscal 1988. A five-year financial summary follows:

COMDISCO DISASTER RECOVERY SERVICES, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

	FISCAL YEAR				
ITEM	9/88	9/87	9/86	9/85	9/84
Revenue	$55.5	$39.3	$27.9	$18.6	$11.6
• Percent increase from previous year	41%	41%	50%	60%	78%
Income (loss) before taxes	$11.9	$10.1	$6.3	$1.7	$(2.0)
• Percent increase from previous year	18%	60%	271%	185%	31%

CDRS management attributes the company's revenue growth primarily to the growth in its customer base and services offered.

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Recent acquisitions include the following:

- In August 1988, CDRS announced the acquisition of Computer Recovery Facility, Inc. (CRF) of Toronto (Canada). The acquisition provides CDRS with its first Canadian "hot" site to serve existing CDRS Canadian customers, as well as more than 80 Canadian customers from CRF. The CRF site also provides CDRS with disaster recovery capabilities for Unisys equipment.

- In August 1988, CDRS acquired Manufacturers Hanover Data Services Corp. (MHDSC) from Manufacturers Hanover Bank of New York. Terms of the purchase were not disclosed.

  - MHDSC, with approximately 30 employees, provided backup services to Manufacturers Hanover Bank. It now operates as Comdisco Computing Services Corporation (CCSC), a wholly owned subsidiary of CDRS based in Carlstadt (NJ), overseeing CDRS' new electronic vaulting services.

  - CCSC also has a four-year contract to continue backup services for Manufacturers Hanover Bank.

- In June 1988, CDRS acquired Recovery Operation Centres Limited (ROC) for approximately $7.5 million.

  - ROC is a U.K.-based firm that provides disaster recovery services to over 450 clients located throughout Great Britain.

  - ROC also has the original design for a mobile computer recovery center, which is now marketed by CDRS as COMROC (Comdisco Mobile Recovery Operations Center).

  - CDRS plans to use ROC as a base for its entry into the U.K. "hot" site market.

As of September 30, 1988 CDRS had approximately 300 employees, compared to 125 employees as of September 1987.

CDRS' primary competitor is SunGard Recovery Services (a unit of SunGard Data Systems Inc.)

Key Products and Services

One hundred percent of CDRS' fiscal 1988 revenue was derived from disaster recovery subscriptions and associated consulting services.

CDRS offers disaster recovery services through nine recovery

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centers located throughout the U.S., Canada, and the U.K. with 17 fully configured "hot" sites and 13 shells or "cold" sites.

- "Hot" sites are fully-equipped computer facilities that include central processors, peripherals, and communications equipment.

  - During fiscal 1987 CDRS added IBM 3090-400E mainframes, 3380E DASD, and 3480 tape drive systems to its recovery centers. Teleprocessing capabilities were expanded by adding Hughes Communications satellite technology.

  - During fiscal 1988 CDRS opened new hot sites in Atlanta and New Jersey, and a hot site in Canada was acquired with Computer Recovery Facility, Inc. In October 1988, CDRS opened an additional hot site in southern California.

  - Out of the 16 hot site locations in the U.S., 13 received more advanced or upgraded computers during 1988.

  - CDRS is also doubling its Tandem backup capability, expanding its DEC backup facilities from one to three sites, and providing IBM System 38 backup capability.

  - Currently, CDRS is conducting a customer requirements survey to determine customer needs before installing an IBM AS/400 computer.

- A "cold" site or "shell" contains all the power, environmental, and support equipment, as well as the communications and networking equipment required for a large computer, but has no actual computer equipment.

The number of subscribers in the U.S. and Canada has increased from over 200 in fiscal 1983 to over 1,000 in fiscal 1988. During fiscal 1988, the number of subscribers increased by approximately 30% and three hot sites were added. A three-year summary of the number of subscribers and facilities provided by CDRS follows:

ITEM	9/88	9/87	9/86
Subscribers	+1,000	+700	+600
Hot sites	16	13	11
Shells	13	14	14

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- The company currently has 17 hot sites and approximately 1,500 subscribers (including clients of businesses acquired during 1988).

New products/services announced by CDRS during fiscal 1988 include the following:

- CDRS' newest service, electronic vaulting, is an enhanced backup recovery capability targeted to customers that record and process their transactions on-line. Examples of these types of customers include banks, brokerage houses, and retail chains.

  - Transactions recorded at a customer's data center are simultaneously recorded at a CDRS site, eliminating the need to physically transport backup tapes.

  - The service involves direct communications under IBM's SNA and VTAM between the customer's mainframe and a dedicated host at CDRS' hot site in Carlstadt (NJ).

- CDRS now offers a network of fixed and mobile satellite earth stations which can bypass telephone control office switching equipment in the event of a disaster.

- CDRS' COMROC mobile computer recovery center is an alternative shell solution for the convenience of the customer. Instead of occupying a shell at a CDRS site, CDRS will build a computer recovery center at the customer's site in a parking lot, in a field, or on any available real estate, within a week of a disaster.

- ComPAS is a disaster recovery software product that uses artificial intelligence and expert system technology to assist customers in developing, testing, and maintaining a full recovery capability tied to their specific industry and business environment.

Other CDRS services include the following:

- Comdisco Remote Testing, which was implemented nationally during fiscal 1987, provides customers access to CDRS recovery centers from their headquarters via a 3270 CRT cluster or a microcomputer.

- Through Comdisco Disaster Recovery Contingency Services, CDRS provides consulting services to prospective and existing subscribers on how to set up recovery plans.

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Industry Markets

CDRS' revenue is derived from clients in various industries, including retail, banking and finance, and manufacturing.

Clients for CDRS' services include Household International, A.M. Castle & Company, and CECO Corporation.

Geographic Markets

CDRS' revenue is derived from the U.S., Canada, and the U.K.

Recovery centers are located in Cypress and San Ramon (CA), Atlanta (GA), Wood Dale (IL), Indianapolis (IN), St. Louis (MO), Bridgeport and Grand Prairie (TX), Carlstadt and North Bergen (NJ), and Montreal and Toronto (Canada).

CDRS is planning to establish operations in Germany and France during fiscal 1989 and has begun exploring the Japanese market.

Computer Hardware and Software

CDRS hot sites are equipped with various IBM systems (including IBM 3090-400E computers), as well as DEC VAX, Tandem, and Unisys systems.

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ELECTRONIC DATA SYSTEMS CORPORATION
7171 Forest Lane
Dallas, TX 75230
(214) 604-6000

Lester M. Alberthal, Jr., Chairman, President, and CEO
Wholly Owned Subsidiary of General Motors Corporation, GM Class E Stock, NYSE
Total Employees: 52,000
Total Revenue, Fiscal Year End 12/31/88: $4,844,100,000
Non-GM Information Services Revenue: $1,907,600,000

The Company

Electronic Data Systems Corporation (EDS), founded in 1962, is a leading information and communications services company providing information processing, systems management, and communications services to the financial, insurance, commercial, and communications industries domestically and internationally and to state and federal government. These markets include banking; credit unions; property, life, health, and casualty insurance; distribution; manufacturing; transportation; retail; and energy.

- EDS currently has more than 6,000 clients in all 50 states and 26 countries worldwide.
- EDS' largest client is General Motors Corporation (GM) and its subsidiaries, which contributed approximately 59% ($2.8 billion) to EDS' 1988 revenue.

EDS and its subsidiaries were acquired by GM in October 1984 for approximately $2.5 billion.

- The acquisition was consummated through an offer to exchange EDS common stock for either $44 in cash or $35.20 in cash plus two-tenths of a share of Class E common stock, plus a nontransferable contingent promissory note issued by GM.
- EDS operates as an independent subsidiary of GM. EDS' performance forms the base from which any dividend on the GM Class E common stock will be declared. These earnings include income earned from services provided to GM and its other subsidiaries.

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- Through its work for GM, EDS has gained expertise in factory automation, strengthened its international presence, and enhanced its communications expertise.

EDS' total 1988 revenue reached $4.8 billion, a 9% increase over 1987 revenue of $4.4 billion. Net income rose 19%, from $323 million in 1987 to $384 million in 1988. A five-year financial summary follows:

ELECTRONIC DATA SYSTEMS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$4,844.1	$4,427.7	$4,366.0	$3,443.3	$947.5
• Percent increase from previous year	9%	1%	27%	264%	295%
Income before taxes	$589.4	$524.3	$464.0	$362.1	$138.7
• Percent increase from previous year	12%	13%	28%	161%	19%
Net income	$384.1	$323.1	$260.9	$189.8	$80.7
• Percent increase from previous year	19%	24%	37%	135%	24%
Earnings per share	$3.15	$2.65	$2.13	$1.57	$0.67
• Percent increase from previous year	19%	24%	36%	134%	24%

A further breakdown of 1988, 1987, and 1986 revenue follows ($ millions):

	FISCAL YEAR		
REVENUE SOURCE	1988	1987	1986
Systems and contracts			
• Outside customers	$1,907.6	$1,444.8	$1,127.7
• GM and subsidiaries	2,837.0	2,883.3	3,195.1
	$4,744.6	$4,328.1	$4,322.8
Interest and other	$99.5	$99.6	$43.2
TOTAL	**$4,844.1**	**$4,427.7**	**$4,366.0**

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EDS management attributes 1988 revenue increases to the following:

- The acquisition of MTech Corp in April 1988;
- Winning more than half of all the business bid for while sustaining its historic 80% renewal rate;
- Strong performance in existing markets and success in new markets, i.e. energy.

Revenue for the three months ending March 31, 1989 reached $1.29 billion, an increase of $165.8 million (15%) over revenue of $1.12 billion for the same period in 1988. Net income for the period rose $10.9 million (12%), from $89.1 million to $100.0 million.

Recent acquisitions made by EDS include the following:

- In May 1989, EDS and Hitachi Ltd. announced the completion of their acquisition of National Advanced Systems Corporation (NAS) from National Semiconductor Corporation. EDS and Hitachi have formed a new, independently operated, joint venture company, Hitachi Data Systems Corp., which will market and distribute Hitachi PCM mainframe and peripheral equipment. EDS holds a 20% equity in the new venture.
- In April 1989, EDS acquired BancSystems Association, Inc. (Westlake, OH), a subsidiary of Society Corporation that provides credit card transaction processing services to the financial services industry. Terms of the purchase were not disclosed.
    - BancSystems, founded in 1969 as a not-for-profit association owned by the member institutions that used its services, was acquired by Society Corporation in 1984.
    - BancSystems provides MasterCard and Visa credit and debit processing and related services to more than 180 financial institutions in Ohio and seven other states with more than 2.4 million cardholders and 38,000 merchants.
    - BancSystems had approximately 300 employees at the time of the acquisition. Its operations have been merged into EDS' Financial Industry Group.
    - EDS will continue to operate out of BancSystems' Westlake offices, where it will continue to perform credit card

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processing for Society Corporation's affiliate banks, other BancSystems customers, and the expanded national business it expects to obtain.

- In April 1989, EDS acquired the electronic funds transfer (EFT) business of Automatic Data Processing, Inc. (ADP). Terms of the acquisition were not disclosed.

  - ADP's EFT business includes a range of services for automatic teller machines and point-of-sale applications for the banking industry.

  - Headquartered in Clifton (NJ), ADP's EFT operations employ nearly 300 people and supply one of the largest networks in the industry.

- EDS' most significant acquisition during 1988 was made in April when the company acquired MTech Corp of Dallas (TX) for approximately $347 million. The acquisition was accounted for as a purchase.

  - MTech stockholders had the option to receive $30 in cash or $13 in cash plus one-third share of GM Class E common stock with a Limited Guarantee for each share of MTech stock.

  - MTech operates the third-largest ATM network in the U.S. and handles the data processing for more than 1,100 financial customers nationwide.

  - MTech had approximately 3,300 employees at the time of the acquisition and 1987 revenue of $232.1 million. EDS expected MTech's business to generate $190 million in revenue for 1988.

  - The operations of MTech have been merged into EDS' Financial Industry Group.

- In November 1988, EDS acquired VideoStar Connections Inc., an Atlanta-based company specializing in private satellite broadcasting services and special-event videoconferencing, and VideoStar's staging services subsidiary, Staging Connections. Terms of the purchase were not disclosed.

  - VideoStar operates 17 private television networks and 1,800 downlinks. The networks are ideal for businesses or institutions that need to distribute product announcements, company or industry news, policy or procedure changes,

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maintenance updates or other news to a widely dispersed audience. Some of its customers are Eastman Kodak, Hewlett-Packard, DEC, Xerox, and Merrill Lynch.

- VideoStar, which now operates as an independent subsidiary of EDS, complements the video production capabilities of EDS' affiliate, Automotive Satellite Television Network, Inc. VideoStar will also make it possible for EDS to offer its line of training and educational programs now available on its internal network to customers of both EDS and VideoStar.

- In November 1988, EDS acquired the data processing operations of Texas Commerce Bancshare's 27 correspondent banks.

- In November 1988, EDS acquired the data processing operations of Cullen/Frost Bankers' 54 correspondent banks.

- In September 1988, EDS acquired a 50% interest in and assumed management control of China Management System (CMS), the largest information services company in Taiwan.

  - CMS, with 1987 revenue of $10 million, specializes in systems integration, systems development, on-line processing, packaged software, and management consulting. Its customers include government agencies, financial institutions, manufacturers, and trading companies.

  - The agreement enables both organizations to extend their international links as well as compete more strongly for focal information processing contracts.

- In September 1988, EDS acquired General Data Systems, Ltd. (GDS) of Philadelphia. Terms of the purchase were not disclosed.

  - GDS specializes in systems and services for the property and casualty insurance industry.

  - GDS had approximately 100 employees at the time of the acquisition. Since 1983, GDS' revenues have increased annually at a compound rate of 38%.

  - The operations of GDS have been merged into EDS' Commercial Insurance Division.

In March 1989, EDS and Hewlett-Packard signed an agreement that formally establishes the framework for cooperation on

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systems integration projects. Under the terms of the agreement, HP and EDS will submit joint proposals to customers for the development, design, management, and support of projects requiring the integration of hardware, software, and project management services.

EDS is currently organized into the following business units:

- The Government Systems Group provides systems integration and systems management/facilities management (FM) services, including support of state-controlled health care (or Medicaid) programs and federal, state, and civilian government customers.

  - The State Operations Division of the Government Systems Group focuses on FM services provided to state governments for the management of various applications, including health care and automobile insurance.

- The Financial Industry Group provides processing/network services, facilities management, and software products to banks, savings and loans, and credit unions.

- The Insurance Industry Group combines EDS' FM insurance business (including Blue Cross/Blue Shield, where state money is not involved), its work in GM's benefits administration, and its work for GMAC.

  - The Commercial Insurance Division provides processing services and software products to insurance companies.

- The Commercial, Communications, and International Services Group supports the following businesses:

  - North American Commercial--non-GM FM and systems automation for the manufacturing, distribution, retail, and energy industries.

  - Communications Services--all communications projects.

  - International--all activities outside North America.

- EDS' General Motors Business Operations Group provides information services in support of most of GM's internal organization, primarily in North America.

Major competitors of EDS by product/service area include the following:

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- Insurance claims processing: Computer Sciences Corporation (CSC), The Computer Company, McDonnell Douglas Information Systems Company, and Unisys.
- Government systems: CSC, Unisys, Planning Research (Black & Decker), and Boeing Computer Services.
- Credit unions: Control Data Business Information Services and Citicorp Information Resources.
- Remote computing services: Boeing Computer Services, Martin Marietta, CSC, and GE Information Services.
- Systems integration: Scientific Applications International, BDM International, Unisys, and IBM.
- Systems operations/facilities management: CSC and Systematics.

Key Products and Services

A three-year summary of source of revenue by operating group is estimated by EDS as follows:

ELECTRONIC DATA SYSTEMS CORPORATION
ESTIMATED SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR		
ITEM	1988	1987	1986
Financial and Insurance	22%	18%	15%
Commercial, Communications, and International Services	17%	16%	13%
Government Systems	14%	14%	12%
Subtotal (a)	53%	48%	40%
GM	47%	52%	60%
TOTAL	**100%**	**100%**	**100%**

(a) These estimates include certain revenue from GM that has been reported in the Commercial, Communications, and International Services and Financial and Insurance Groups.

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EDS services are offered as follows:

- Facilities Management (FM): EDS assumes virtually all of the data processing and communications requirements for the customer over a multiyear term. Responsibilities include the design and implementation of business information systems, the staffing of the data processing functions, the development and maintenance of necessary software, and the operation of all computer activities.

- Systems Integration: EDS designs, implements, and installs the appropriate combination of hardware and software integrated into a total system designed to fulfill the customer's processing and communications requirements.

- Fiscal Agent: EDS is responsible for all data processing functions as well as other administrative duties. These may include processing and paying claims as well as ensuring proper coordination of benefits.

- Professional Services: EDS provides system design, custom/contract programming, consulting, engineering services, education, and training.

- Processing Services: EDS provides data processing services from an EDS data center billed on a predetermined minimum monthly basis, usually based on the number of transactions.

The Government Systems Group provides FM and systems integration services to federal, state, and local government customers. Contract examples include the following:

- In May 1989, EDS was awarded a three-year, $100 million contract (with options for two one-year extensions) with the state of Florida Department of Health and Rehabilitative Services. EDS will transfer, implement, and operate the Florida On-Line Recipient Integrated Data Access System, which will be used to determine program eligibility and to issue benefits for several major state human-service programs. EDS will supply all training, conversion, and maintenance services.

- During the first quarter of 1989, EDS signed an agreement with the U.S. General Services Administration to assist federal agencies that need immediate system-conversion support services, and won a contract with the Foundation Health Corp. (FHC) to help the FHC with managing the CHAMPUS health care program.

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- In October 1988, EDS signed a six-year contract to implement Unified Local Area Network Architecture for the Air Force. EDS, Bridge Communications, and over 20 other suppliers will deliver and install bridges, gateways, and host attachments on existing local area network cabling for over 200 Air Force bases nationwide. EDS will also provide engineering services and maintenance and training for those Air Force installations implementing local area networks.

- During 1988, EDS received a five-year contract to continue to provide technical, analytical, development, and program management support for the Marine Corps Standard Supply System. The system automates the procurement, distribution, and management of essential supplies for the Marines worldwide.

- In August 1988, EDS won an eight-year contract with the Navy to convert the application support system for the Stock Point ADP Replacement Conversion project at 33 sites worldwide. EDS will implement and maintain the new system, design a data base, and conduct training.

- In October 1988, EDS signed a one-year contract (with four one-year extensions) with the U.S. Immigration and Naturalization Service to implement a turnkey solution for the manufacture of identification cards and management of alien records.

- In August 1987, EDS announced a major systems integration contract with the U.S. Army to implement and operate Project 80X. Under the nine-and-one-half-year agreement, EDS is standardizing and integrating all hardware systems, data base software, and communications components for the U.S. Army's worldwide personnel management system.

- Medicaid contract awards include the following:

  - In February 1989, EDS signed an eight-year contract to provide full fiscal agent services for the North Carolina Division of Medical Assistance (DMA). EDS will provide claims processing as well as management and utilization review reporting for DMA as it has done since 1977.

  - During the first quarter of 1989, EDS also won a new five-year contract with Wyoming to perform claims processing and other fiscal agent functions for the state's Medicaid program.

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- In December 1988, EDS signed a four-year contract to continue providing program management and data processing services for the Texas Medicaid program. EDS has administered this program since 1977.

- During 1988, EDS also signed new Medicaid contracts with Idaho and Alabama, and extended contracts in Arkansas, Georgia, and Kansas.

- Other state government contracts awarded during 1988 included the Florida Student Loan Program, the New York Commercial Drivers License System, the Recipient Eligibility Verification System for Medicaid recipients in the Commonwealth of Massachusetts, and California In-Home Support Services.

- In October 1988, the Government Systems and Financial and Insurance Groups joined together to win a seven-year contract valued at over half a billion dollars. Under one of the company's largest contracts ever, EDS will provide the New Jersey Automobile Full Insurance Underwriting Association with full program management services to 425,000 policy holders.

The Financial Industry Group provides processing/network services, FM services, and application software products to the financial services industry.

- Recent contract awards from financial customers include the following:

  - In March 1989, EDS signed a ten-year FM agreement under which EDS will assume all data processing responsibilities, as well as all voice and data communications for the Meritor Savings Bank of Philadelphia. EDS will install its Integrated Financial System, which provides integrated back-office services for financial institutions.

  - During the first quarter of 1989, EDS also won a new contract with the Dallas-based Deposit Guaranty Bank to assume responsibility for all of that bank's data processing for the next five years.

  - Under another five-year agreement, EDS will handle all data processing in New York City for Banco de Ponce, which is headquartered in San Juan (Puerto Rico) and has 14 branches in New York.

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- In April 1988, EDS won a 10-year FM agreement with Houston-based First City Bancorporation of Texas, Inc. EDS is consolidating and managing the information of First City's 28 member banks operating in 62 locations.

- Sooner Federal Savings and Loan of Tulsa (OK) signed a five-year agreement for EDS to provide its Integrated Financial System.

- During 1988, EDS also signed new or extended existing contracts with Arizona State Savings and Credit Union (Phoenix), Cullen Frost Bank, First Colonial Bankshares (Chicago), Farm Credit Bank (St. Louis), Gulfbanks, Inc. (Corpus Christi), Republic Federal Savings in California, and Virginia Federal Savings & Loan Association.

• Presently, EDS processes information for more than 12 million credit union members and more than 3,000 credit unions through its CUNADATA division.

  - During 1988, EDS signed 633 credit union contracts.

  - FLAGSHIP[R] is EDS' credit union processing system that provides comprehensive support options to meet the needs of credit unions, regardless of size.

• Major bank processing applications offered include the following:

  - The Deposit System allows a financial institution to offer a variety of deposit products to both commercial and individual customers. These products include checking accounts, savings accounts, certificates of deposit, tiered interest rate money market accounts, and IRA and Keogh accounts. Cash management functions available include account analysis and balance reporting.

  - The Loan System processes the financial institution's consumer, commercial, and mortgage loan portfolios. Consumer loan processing services include automatic coupon book ordering, officer performance reporting, delinquency reporting, credit bureau interfaces, variable loan rate adjustment, credit life insurance calculation, and processing of automatic drafts from deposit accounts. Commercial loan processing services include additional capabilities such as complete commitment accounting, collateral tracking, and participant account reporting. Mortgage loan services include processing for adjustable rate

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loans, investor reporting, loan warehousing, and escrow accounts and analysis.

- The Financial Accounting and Reporting System provides general ledger, budgeting, financial accounting, and cost accounting capabilities for financial institutions. Asset and liability management systems, planning and forecasting systems, and other financial management services are also provided.

- The Customer Information System integrates all of a financial institution's banking applications into a single system and provides an information data base and the accounting and audit controls necessary to maintain the data base. All banking transactions are posted to an on-line general ledger, and customized internal reports detailing customer profitability, budget variances, and cost/profit center performance are generated.

- Back office services include proofing and encoding, bulk statement filing, statement mailing, and truncation in order to accommodate additional check processing needs of its customers. Other services include account reconciliation processing, document storage, filming, stamping, archival storage, and statement rendering.

- Microcomputer software and related products permit access to EDS' mainframes on a remote basis. Products are available for Asset/Liability Management, Financial Management Information, Loan Origination and Document Printing, Loan Loss Control, Safe Deposit Box, Call Reporting, Back-Up Withholding (1099s), General Ledger, Fixed Asset Accounting, and Planning & Budgeting.

- Through the acquisition of MTech, EDS complemented its activities in the financial marketplace.

  - EFT services are provided to financial institutions and retailers through the MPACT Network.

    - The MPACT Network, established in 1979, includes approximately 1,300 MPACT ATMs and approximately 2.5 million MPACT debit cards issued to customers of member financial institutions located primarily in Texas, Louisiana, Arkansas, New Mexico, Oklahoma, West Virginia, and Massachusetts.

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- MPACT has interface relationships with 24 other regional and national networks such as CIRRUS, PULSE, American Express, HONOR and DISCOVER, which allow approximately 50 million additional holders of debit cards access to the MPACT Network and make over 15,000 additional ATMs available to MPACT cardholders.

- Financial transaction processing software products, generally available both domestically and internationally, include the following:

  - The Card Management System performs daily limit tracking on the use of a customer's debit or credit card. The system is designed primarily for financial institutions that issue debit/credit cards. GTE also uses the system for its FON debit cards.

  - The Card Authorization System provides electronic or voice authorization/denial of debit and credit card transactions. The system is designed for any financial institution that issues debit and credit cards.

  - The Card Processing System is an integrated debit and credit card processing system for large financial institutions with large debit and credit card portfolios. The system processes transactions for national credit cards as well as private-label cards.

  - The Merchant Accounting System supports a financial institution's accounting function as it relates to merchants and their revolving credit relationship with an institution. The system performs accounting for merchant deposits, discounting, fee billing, invoicing, and profitability.

The Insurance Industry Group provides FM and processing services and turnkey systems to commercial insurance companies and Blue Cross/Blue Shield organizations (where state money is not involved).

- During 1988, EDS processed over 330 million life, health, and casualty insurance claims, impacting over 50 million people.

- EDS provides centralized processing and communications services to a major insurance industry consortium that serves 70% of all Fortune 500 companies. In 1988, one in five Americans in 40 states participated in this program. More than 23 million claims were processed.

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- During the first quarter of 1989, EDS signed a 12-year FM agreement with Whitehall Insurance Holdings, Ltd. to convert the life and group business of one of Whitehall's subsidiaries (Bradford National Life Insurance Co.) to the Equity Plus and Group Management Systems at another Whitehall subsidiary (Lamar Life Insurance Co.).

- During 1988, EDS was awarded the following insurance processing/FM contracts:

  - EDS was awarded a contract with Blue Cross/Blue Shield of Illinois to implement a multi-carrier system in several of its offices and link them using EDS*NET and EDS information processing centers.

  - In January 1988, EDS received a twelve-year FM contract extension from Security Mutual Life Insurance Company. EDS will install The Insurance Machine[R], a life insurance administration system. Other Insurance Machine clients include Allstate, Union Central Life, Colonial Life and Accident, Motors Insurance Corporation, Chubb Life Insurance Co. of America, the Amfas Group of the Netherlands, and Confederation Life of Canada.

- During the fourth quarter of 1988, EDS, in cooperation with the Harvard Community Health Plan, formed Interpractice Systems. This separate company will develop and market an integrated clinical, administrative, and financial management system targeted to various health care organizations. The new system will automate medical records as well as provide diagnostic and patient self-education information.

- With the acquisition of General Data Systems, Ltd. (GDS) during 1988, EDS also offers turnkey systems for the automation of underwriting decisions, rating lines of insurance, and the processing of commercial policies for property and casualty insurance companies.

The Commercial, Communications, and International Services Group provides a range of FM, systems integration, and professional services to domestic and international clients. EDS was one of the world's first commercial systems integration specialists and has emerged as a major force in both government and commercial markets.

- Examples of recent domestic commercial contracts obtained by EDS include the following:

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- In November 1988, EDS formed a ten-year enterprise management agreement with Enron Corp. (Houston), a leading U.S. gas company, to assume management responsibility for Enron's computing, software development, and telecommunications functions.

- During 1988, EDS was awarded FM contracts with several other oil and gas industry clients, including Placid Oil Co. of Dallas (five-year contract), Hunt Energy Corporation (five-year contract), Penrod Drilling Corporation (one-year contract), and Freeport-McMoRan of New Orleans.

- In the fourth quarter of 1988, EDS signed a contract with TELIC to provide computer and data processing resources. TELIC provides customized administrative and operations software systems to telephone, electric, and gas companies in North America.

- In February 1988, EDS signed a ten-year contract to provide systems integration, telecommunications, and FM services to the Loews Anatole Hotel in Dallas.

- During 1988, EDS won an eight-year FM contract with Riser Foods, Inc., a retail grocery and wholesale distributor in Ohio.

- During 1988, EDS was awarded an eight-year contract from jewelry manufacturer CJC Holdings to provide FM services, implement financial applications, and consolidate manufacturing systems.

- As a systems partner to Apple Computer, EDS will assist in upgrading Apple's corporate computer and communications capabilities.

- In August 1988, EDS signed a major plant automation agreement with Caterpillar to integrate manufacturing software packages being installed in Caterpillar's new plants in Aurora and East Peoria (IL).

- During the fourth quarter of 1988, EDS formed an agreement with Ryder System to define, develop, and implement a corporate-wide human resource management system.

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- International contract awards include the following:

  - During the first quarter of 1989, EDS signed a three-and-one-half-year agreement with BASF (a West German chemical company) to provide an information technology infrastructure for the chemical company's storage and packaging department.

  - In Spain, EDS will develop and implement an automatic warehouse system for Danone, a large producer of dairy products.

  - Under contract with DANZAS-SATEM (France), EDS will operate and maintain the company's distribution systems.

  - EDS' seven-year contract extension with French manufacturer Gallay provides for administrative systems and manufacturing applications services.

  - Also during the quarter, EDS negotiated a 10-year contract with the International Bank of Asia (Hong Kong) to assume responsibility for its information-technology systems.

  - In December 1988, E.D.S. of Canada, Ltd. received a five-year contract to provide complete processing services for CAMI Automotive, Inc., a joint venture between GM of Canada and Suzuki.

  - In February 1988, EDS was awarded a seven-year agreement with the United Kingdom Civil Aviation Authority (CAA) to manage the CAA's administrative computer systems and headquarters data center. EDS is also participating in the development of improved communications between CAA's departments. The operation of 60 offices will be linked through minicomputer installations, which are to be integrated with a headquarters administrative system.

  - During 1988, EDS and Shearson Lehman Hutton finalized a five-year agreement for EDS to implement an extended application of TradePro for Shearson's international operations. This is in addition to EDS' work in support of Shearson's UK securities trading in capital markets and international equities.

  - EDS will assist France Telecom in the implementation of telecommunications capabilities that will allow France Telecom to provide integrated voice and data services to its customers.

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- During 1988, EDS won a contract extension with Unilever, the Anglo/Dutch consumer products company, to provide FM and systems integration services for ten Unilever operating companies.

- EDS signed a five-year contract with Sociaal Fonds Bouwijverheid, the social security administration for the Dutch construction industry, to install and operate a pension fund system.

- EDS finalized an eight-year contract with Netherlands shipbuilder Verolme Scheepswarf Heusden B.V. to develop and manage new financial and reporting, personnel, time registration, and production systems.

- EDS currently has more than 250 international contracts with clients in various industries.

EDS' GM revenue comes from designing, installing, and operating GM information systems and implementing the automaker's large private digital telecommunications network. Project examples include the following:

- During 1988, EDS signed a five-year, fixed-price agreement with GM's Automotive Components Group to provide computer, information processing, and communications services.

- EDS has a long-term, fixed-price agreement with Chevrolet-Pontiac-GM of Canada Group to provide development, ongoing support, IPC operations, plant floor automation services, and communications support.

- EDS and Buick-Oldsmobile-Cadillac Group (B-O-C) finalized a five-year contract for EDS to provide computer, information processing, and communications services to B-O-C's 26 manufacturing plants and business locations.

- During the fourth quarter of 1988, EDS signed a four-year contract extension with the GM Truck & Bus Group. This extension was made half-way through an existing five-year contract.

- In July 1988, EDS signed individual contracts with CADAM, Inc. and McDonnell Douglas Information Systems Company that call for the two firms to act as strategic partners in GM's CAD/CAM/CAE/CIM (C4) program. The program's goal is to build a C4 Data Pipeline, encompassing a data, computing,

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and communications architecture based on open industry standards. CADAM and McDonnell Douglas software, combined with EDS' corporate graphics system software, will form the nucleus for the C4 program.

- EDS continues to support all other areas of General Motors, including GMAC and staff and administrative functions.

Industry Markets

Approximately 59% ($2.8 billion) of EDS' total 1988 revenue was derived from its parent company, GM, and 2% was derived from interest and other. The remaining 39% ($1.9 billion) of total revenue was derived from clients in various industries, including banking and finance, insurance, manufacturing, retail, distribution, transportation, and energy.

Geographic Markets

INPUT estimates approximately 90% EDS' total 1988 revenue was derived from North American operations. The remaining 10% was derived from international sources.

EDS has nearly 7,300 international employees.

Computer Hardware

EDS currently operates 21 Information Processing Centers (IPCs) worldwide.

- EDS has over 300 mainframes from various manufacturers installed at these centers, including IBM, National Advanced Systems (NAS), and Amdahl systems.

- IPC locations include Richardson, Dallas, and Plano (TX); Sacramento (CA); Camp Hill (PA); Auburn Hills and Warren (MI); Herndon (VA); and Paris.

In March 1989, EDS officially opened the world's first Information Management Center (IMC) in Plano (TX), a network command site responsible for managing EDS*NET, EDS' private digital network that will ultimately manage the telecommunications needs of EDS' Information Processing Centers.

- Through EDS*NET, over 730 million transactions are processed each month--nearly 17,000 transactions per minute.

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FIRST DATA RESOURCES INC.
7302 Pacific Street
Omaha, NE 68114-5497
(402) 399-7000

Edward C. Nafus, President
Unit of American Express Information Services Company
Total Employees: 4,500
Total Revenue, Fiscal Year End 12/31/89: $275,000,000*

*INPUT estimate

The Company

First Data Resources Inc. (FDR[R]), founded in 1971, is the world's leading third-party processor of credit and debit card transaction processing services.

FDR currently operates as a wholly owned subsidiary of American Express Information Services Company (ISC), which is one of four major operating units of American Express Company.

- During 1989, American Express reorganized FDR's information services businesses into separate groups within ISC. In addition to FDR, ISC units now include Health Systems Group, Shareholder Services Group, Integrated Payment Systems, WATS Marketing Group, and Cable Services Group.

INPUT estimates that FDR's 1989 proforma revenue from its credit and debit card transaction processing services was $275 million.

Acquisitions made by FDR include the following:

- In August 1988, FDR acquired Eastern States Bankcard Associates of Lake Success (NY). Terms of the acquisition were not disclosed.
  - Eastern States is an association that provides bank credit card processing services for VISA and Mastercard to Manufacturers Hanover Trust and about 100 other member banks.
  - Eastern States had approximately 950 employees at the time of the acquisition.

FDR's major competitors in the card processing area include Total Systems and Southern States Bankcard Association. Competitors

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in the authorization area include National Data Corporation and First Financial Management Corporation (NABANCO).

Key Products and Services

One hundred percent of FDR's 1989 revenue was derived from transaction processing and associated support services.

FDR provides a range of services for the management and automation of debit and credit card activities, including cardholder and merchant accounting, authorizations, and plastic card services.

- Transaction services are provided to more than 700 financial institutions.
- FDR annually processes over one billion transactions for 39 million cardholder accounts.
- FDR handles more than 326 million authorizations each year, using technology that includes:
    - Electronic Ticket Capture (ETC), a point-of-sale recording system.
    - Voice by phone.
    - Touch-tone telephone entry and computer-synthesized voice response (Audio Response Units).
    - Point-of-Sale (POS) from dial-up terminals and leased terminals via a network of access points.
    - Electronic cash register (CPU-to-CPU).
- FDR Security provides a nationwide investigation and fraud prevention system for card-issuing institutions in the U.S.
- CardShare Services, Inc. an FDR subsidiary, provides credit card registration, travel reservation services, and various insurance products to issuers that offer them to cardholders as benefits.
    - CardShare also offers insert/merchandising programs and other services, such as CardSecure credit card registry and a Discount Buying Service.

First Data Resources, Ltd., headquartered in London, provides credit card processing services in the U.K.

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FDR no longer provides reservation management services to airlines.

Industry Markets

One hundred percent of FDR's revenue is derived from the banking and finance industry.

Geographic Markets

The majority of FDR's 1989 revenue was derived from the U.S. A small percent is derived from U.K. operations.

The major portion of First Data Resource's centralized processing facilities is located in Omaha.

Processing and service centers are also located in Atlanta, Boston, San Mateo (CA), New York City (Long Island), and Brighton (U.K.).

Computer Hardware and Software

FDR has NAS AS/9080 and IBM 3090-200 computers operating under MVS/XA installed at its data center in Omaha.

Communications nodes and data transmission facilities are handled with 56 IBM Series I minicomputers.

The FDR system supports 66,000 electronic ticket capture terminals.

Clients may access FDR's services via WATS lines, leased lines, FDRnet (FDR's proprietary network), TYMNET, or Telenet.

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FIRST FINANCIAL MANAGEMENT CORPORATION
3 Corporate Square
Suite 700
Atlanta, GA 30329
(404) 321-0120

Patrick H. Thomas, Chairman, President, and CEO
Public Corporation, NYSE
Total Employees: 8,201 (12/89)
Total Revenue, Fiscal Year End 12/31/89: $666,740,000
Information Services Revenue: $585,000,000

The Company

First Financial Management Corporation (FFMC), founded in 1971, provides a range of processing services, including financial institution processing, data imaging, micrographics, medical claims servicing, and merchant credit card authorization, processing, and settlement. FFMC also operates a hybrid financial institution and a finance company. Services are currently provided to over 70,000 commercial customers and 450,000 consumers.

Since 1983, FFMC has completed 29 acquisitions, which represent annualized revenues of $670 million and added 8,000 employees, 68,500 commercial customers and 450,000 consumer customers.

- During 1989, FFMC acquired three information services firms, including The Computer Company, MicroBilt Corporation, and Data Preparation, Inc.

- In May 1989, FFMC also completed the acquisition of Georgia Federal Bank for $234.5 million. Georgia Federal, the largest thrift institution in Georgia, provides FFMC with a link to the U.S. payments system for its commercial services business, including membership in the Mastercard and VISA associations.

- FFMC management believes its company is the largest provider of processing services to financial institutions in the U.S.

FFMC's total 1989 revenue reached $666.7 million, a 56% increase over 1988 revenue of $427.6 million. Net income rose 73%, from $34.5 million in 1988 to over $56.8 million in 1989. In the five-year summary that follows, financials have been restated to reflect the pooling-of-interests acquisition of MicroBilt Corporation in 1989:

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FIRST FINANCIAL MANAGEMENT CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions, except per share data)

	FISCAL YEAR					
ITEM	1989	1988	1987	1986	1985	CAGR
Revenue	$666.7	$427.6	$177.1	$74.4	$52.7	89%
• Percent increase from previous year	56%	141%	138%	41%	N/A	
Income before taxes	$92.8	$56.7	$23.7	$12.5	$7.6	87%
• Percent increase from previous year	64%	139%	90%	65%	N/A	
• Gross margin	14%	12%	13%	17%	14%	
Net income	$56.8	$34.5	$14.4	$7.3	$4.8	85%
• Percent increase from previous year	65%	140%	97%	51%	N/A	
• Net margin	9%	8%	8%	10%	9%	
Earnings per share	$2.15	$1.69	$1.08	$0.67	$0.52	43%
• Percent increase from previous year	27%	56%	61%	29%	N/A	

1989 acquisitions accounted for approximately one-half of the revenue growth and internal marketing efforts and core business growth (including acquisitions completed in prior years) accounted for the remainder.

Information services acquisitions made during 1989 and 1988 include the following:

- In October 1989, FFMC completed the acquisition of MicroBilt Corporation of Atlanta (GA) in exchange for FFMC common stock valued at $118.7 million.

  - MicroBilt, with approximately 200 employees, develops and markets integrated data communications and information processing systems for niche markets. The company currently targets the credit verification, health care, wholesale, and retail markets.

  - Microbilt had revenue of $23.1 million for the fiscal year ending January 1989 and $24.3 million for calendar 1989. Net income was $5.2 million in fiscal 1989 and $4.9 million in calendar 1989.

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- MicroBilt currently operates as a subsidiary within FFMC's Merchant Services business segment.

- In September 1989, FFMC completed the acquisition of The Computer Company (TCC), a subsidiary of Blue Cross and Blue Shield of Virginia, for $38.2 million in cash plus contingent payments based on future performance.

  - TCC provides processing services for Medicaid programs and pharmaceutical claims.

  - TCC now operates as part of FFMC's Data Imaging and Micrographics Services Group within the Data Services business segment.

- In July 1989, FFMC purchased the credit card processing contract of Security Pacific National Bank of Los Angeles for approximately $15.1 million. The exclusive 10-year contract will be performed by FFMC's subsidiary, NaBANCO.

- In July 1989, FFMC acquired Data Preparation, Inc. (DPI) of Birmingham (AL) for $3.1 million in cash and stock plus contingent payments based on future performance. DPI is a data capture and conversion firm with annual revenue of $6 million. Its operations have been merged into FFMC's Appalachian Computer Services subsidiary.

- In December 1988, FFMC completed the acquisition of Appalachian Computer Services, Inc. (ACS) of London (KY) for $22.3 million in cash, $24.2 million in FFMC stock, and contingent payments based on future performance.

  - ACS, with 1988 revenue of approximately $60 million, has 23 year experience in designing, maintaining, and managing large data base operations.

  - ACS now operates as a wholly owned subsidiary of FFMC within the Data Imaging and Micrographics Group of the Data Services business segment.

- During the fourth quarter of 1988, FFMC acquired a credit union processing center located in Flint (MI) from Anacomp for $2.4 million in cash. The center provides processing to approximately 120 customers. Its operations have been merged into FFMC's Data Services business segment.

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- In February 1988, FFMC acquired the credit card processing contracts of Manufacturers Hanover Trust Company for $2.1 million.

  - The contracts involve services provided to approximately 4,800 merchants in all 50 states with annual credit card sales of $1.2 billion.

  - These contracts, with an annual revenue base of $25 million, have been merged into FFMC's Merchant Services business segment.

As a result of its acquisition of Georgia Federal Bank, FFMC conducts its operations in areas--Consumer Services, which includes the operations of Georgia Federal Bank and its subsidiaries, and Commercial Services, which includes FFMC's information services activities. The company's Commercial Services are further organized into two business segments as follows:

- The Data Services business segment, with over 5,000 employees, provides information services through the following groups:

  - Basis Information Technologies, Inc. (BASIS) provides processing services to financial institutions. BASIS (formerly the Financial Services Group) represents the reorganization of FFMC's 17 financial institution processing acquisitions into one functional organization. BASIS serves over 1,100 customers in 42 states.

  - The Data Imaging and Micrographics Group consists of the operations of Endata (computer output micrographics), Appalachian Computer Services (data management), and The Computer Company (health care claims processing). This group provides services to over 7,400 customers in 46 states.

- The Merchant Services business segment provides information services through NaBANCO (merchant credit card processing) and MicroBilt (integrated systems for retail, wholesale, credit verification, and health care markets).

A three-year financial summary by business segment follows:

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FIRST FINANCIAL MANAGEMENT CORPORATION
THREE-YEAR FINANCIAL SUMMARY
($ millions)

	FISCAL YEAR					
	1989		1988		1987	
ITEM	$	PERCENT OF TOTAL	$	PERCENT OF TOTAL	$	PERCENT OF TOTAL
Revenue						
Data Services	$260.3	39%	$194.7	46%	$114.5	65%
Merchant Services	324.7	49%	232.2	54%	63.5	36%
Consumer Services	92.0	14%	--	--	--	--
Corporate	(10.2)	(2%)	0.7	--	(0.9)	(1%)
TOTAL	**$666.7**	**100%**	**$427.6**	**100%**	**$177.1**	**100%**
Income before taxes						
Data Services	$52.9	57%	$39.8	70%	$24.6	104%
Merchant Services	37.7	41%	31.4	55%	11.2	47%
Consumer Services	25.5	27%	--	--	--	--
Corporate	(23.2)	(25%)	(14.5)	(25%)	(12.1)	(51%)
TOTAL	**$92.8**	**100%**	**$56.7**	**100%**	**$23.7**	**100%**

Data Services revenue increased 34% in 1989 primarily as a result of acquisitions.

- Internal growth within the computer output micrographics product line was offset by other declines in revenue from financial institution processing services. During 1989 FFMC consolidated its financial institution processing operations, reducing the number of host (major) data centers from 20 to 12 and the total number of data centers by 30%. Also during 1989, First Union Corporation of Georgia completed its conversion from FFMC data processing systems to its in-house system.

Merchant Services revenue increased 40% during 1989. The acquisition of the merchant credit card portfolio of Security Pacific accounted for approximately one-third of this growth, while the remainder was due to the success of internal marketing efforts and growth of existing customers.

- Income before taxes declined slightly in 1989 due to increases in interchange fee rates and increases in fixed costs. In anticipation of future growth and a change in mix of the

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customer base to smaller, higher margin merchants, Nabanco's operations were upgraded and expanded in facilities, equipment, and personnel.

Key Products and Services

Approximately $585 million of FFMC's total 1989 revenue was derived from information services provided through the company's Data Services and Merchant Services operations. Approximately 96% of information services was derived from various processing services and 4% from integrated systems provided by MicroBilt.

A three-year summary of source of information services revenue by service mode (before corporate adjustments) follows:

FIRST FINANCIAL MANAGEMENT CORPORATION
THREE-YEAR SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	1989		1988		1987	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Processing services						
• Credit card	$300.4	51%	$209.1	49%	$50.2	28%
• Financial institutions	126.7	22%	136.8	32%	100.9	57%
• Other (a)	133.6	23%	57.9	14%	13.6	8%
	$560.7	96%	$403.8	95%	$164.7	93%
Integrated systems (b)	$24.3	4%	$23.1	5%	$13.3	7%
TOTAL	**$585.0**	**100%**	**$426.9**	**100%**	**$178.0**	**100%**

(a) 1987 and 1988 numbers represent computer output micrographics and direct mail services provided by Endata. 1989 revenue includes the operations of Endata, ACS, and three months of revenue from The Computer Company.

(b) Represents revenue from the pooling-of-interests acquisition of MicroBilt.

Data Services:

BASIS provides processing services to over 1,100 customers in 42 states. Clients include commercial banks, mortgage banks, thrift institutions, and insurance companies.

- Financial transactions supported include deposits, loans, and mortgage origination and servicing, in addition to financial accounting.

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- Services are generally offered under multiyear contracts of three to five year initial terms. Fees are based on the number of transactions handle and accounts maintained for each service, subject to minimum monthly charges.

- Data Services operates three proprietary ATM networks and provides communications links to 38 national or regional non-proprietary ATM networks.

- During 1989, FFMC entered into an agreement with IBM to develop and support a common integrated bank application software product for providing electronic delivery of information to financial institutions.

Through the Data Imaging and Micrographics Group, FFMC provides data imaging services and data base services to over 74,00 customers in 46 states through three units:

- Endata provides computer output micrographics (COM) services to more than 5,000 customers, operating from 30 locations in 16 states.

  - Micrographics equipment, including microfiche and microfilm readers, reader/printers, microfilm cameras, and related supplies, are also sold to COM customers.

  - Large-volume custom laser printing services are provided to major commercial and non-profit organizations through a facility in Nashville (TN).

- Appalachian Computer Services (ACS) provides data base design, entry, and management; image conversion; and systems operations services for approximately 1,500 customers through centers located in eight states.

  - The operations of ACS were expanded with the acquisition of Data Preparation, Inc. during 1989.

  - Direct mail marketing services (formerly provided through Endata) include consulting, design of direct mail marketing programs, statistical analysis, procurement of names, artwork and copy, extraction of computer-based file information, electronic printing of direct mail materials, and lettershop services. These services are provided to direct mail fund raisers nationwide.

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- The U.S. Immigration and Naturalization Services, the U.S. Department of Justice, and Federal Express are major customers of ACS.

- The Computer Company (TCC), acquired during 1989, provides transaction processing services for Medicaid programs in eight states and Washington, D.C. and processes pharmaceutical claims for private and public third-party payers.

  - TCC has been a fiscal agent in the Medicaid System for 17 years, and processes about 83 million Medicaid claims annually using its Medicaid Management Information System (MMIS). These services are provided on a contractual basis generally with terms of three years or more.

  - TCC currently processes 17 million pharmaceutical claims annually. The company provides services on the largest government pharmaceutical claims processing contract in the nation, the Pharmaceutical Assistance Contract for the Elderly (PACE) for the state of Pennsylvania.

  - In total, TCC processes more than 100 million claims annually worth $7 billion. Total calendar 1989 revenues are estimated at over $54 million.

Merchant Services:

NaBANCO, a wholly owned subsidiary of FFMC, provides full service third-party credit card authorization, processing, and settlement services to approximately 50,000 customers throughout the U.S. and the Caribbean.

- Merchants served range from large, multilocation retailers to one location specialty stores, restaurant and hotel chains, mail order companies, government/utilities, car rental agencies, and financial institutions. Clients also include fast food chains, theaters, and supermarkets. Customers include over 200 major merchants with annual sales in excess of $150 million each.

- Annual credit card volume is expected to reach $24 billion in 1990, up from $17 billion in 1989 and $12 billion in 1988. Over 95% of the transactions settled by NaBANCO are done electronically.

- Services are provided through processing centers in Sunrise (FL) and Melville (NY). These operations support over 77,000 electronic cash registers and over 40,000 dial up point-of-sale authorization and draft capture terminals.

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- Fees for credit card services are based on the dollar volume of transactions processed.

- In July 1989, FFMC and Security Pacific National Bank signed a 10-year exclusive contract for NaBANCO to provide credit card authorization, processing, and settlement services for the merchant customers of Security Pacific.

  - FFMC exchanged rights under a bank data processing contract with Central Banking System in Walnut Creek (CA) and $6 million in cash in return for the 10-year exclusive contract.

  - The business represents over 15,000 customers with annual credit card sales between $3 and $4 billion, adding an estimate $70 million in annual revenue to FFMC.

- Gateway switching to major check guarantee services (JBS, Telecredit, and Telecheck), check authorization, and debit card support are also available to NaBANCO customers.

- NaBANCO also offers specialized services such as cash consolidation and specialty data capture applications, property management credit card interfaces for hotel and restaurant chains, and on-line address verification for mail order merchants.

MicroBilt markets and supports low-cost data communications systems for specific industries/applications that require data transmissions to and from numerous remote locations.

- The systems, which use MicroBilt proprietary software and intelligent workstations, generally replace the use of mail, voice telephone, and other less efficient systems to send and receive information.

- Systems are available for credit verification, electronic forms processing (health care), message broadcast and electronic forms communications (wholesale industry), and retail systems.

- MicroBilt currently provides its products and support services to more than 12,000 customers.

Industry Markets

FFMC company currently provides information services to over 1,100 financial institutions and ATM systems, 7,400 data imaging customers, and 62,000 merchants in all 50 states.

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Financial services customers range in size from newly-chartered institutions with the minimum required capital, to institutions with up to $2 billion in assets.

Credit card services are marketed to large multi-location retailers, mail order companies, restaurant chains, and hotels.

Data imaging services are marketed to large commercial clients, as well as non-profit organizations and other direct mail fund raisers.

Geographic Markets

One hundred percent of FFMC's 1989 revenue was derived from the U.S.

FFMC currently operates data centers and branch offices in 46 states.

Computer Hardware

In December 1989, FFMC sold the majority of non-IBM hardware for $31.0 to a third-party lessor. FFMC also agreed to a bundled lease of computer equipment and software maintenance and support services with IBM for a minimum of six years beginning in 1990.

FFMC data centers are located as follows:

- BASIS operates 12 major data centers plus additional service centers.
- Data Imaging and Micrographics Services has 30 data centers located nationwide.
- Merchant Services has data centers in Sunrise (FL) and Melville (NY).

As previously discussed, FFMC is taking steps to eliminate redundancies and increase the efficiency of its nationwide communications network.

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LITTON COMPUTER SERVICES

1300 Villa Street
Mountain View, CA 94043
(415) 966-1771

Henry Bodurka, President
Division of Litton Industries, Inc.
Total Employees: 1,000 (7/88)
Total Revenue, Fiscal Year End
7/31/88: $100,000,000*
Noncaptive Information Services
Revenue: $70,000,000*

* INPUT estimate

The Company

Litton Computer Services (LCS) provides processing services to commercial clients and state and local government and professional services to the federal government. LCS also provides processing services support to its parent company, Litton Industries.

- LCS was reorganized in 1973 to combine the operations of two separate Litton divisions:
  - Litton Mellonics was formed in 1964 by Litton after the acquisition of Mellonics, Inc., a small development company in Sunnyvale (CA). This division provided professional and processing services.
  - Litton Computer Services was formed in 1971 to provide remote computing services to Litton and other clients from its data center in Reston (VA).

INPUT estimates LCS' total fiscal 1988 revenue was $100 million, compared to $100 million in fiscal 1987.

In early 1989, LCS increased its number of employees to approximately 1,200, with nearly all located in the U.S. and a few in foreign locations.

Major competitors include Computer Sciences Corporation, Unisys, and McDonnell Douglas Information Systems Group.

Key Products and Services

INPUT estimates approximately 70% ($70 million) of LCS' fiscal 1988 revenue was derived from noncaptive sources and the remaining 30% ($30 million) was derived from processing services provided to other divisions and/or subsidiaries of Litton.

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- Approximately 50% of noncaptive revenue was derived from processing services (54% batch and 46% remote computing) and 50% was derived from professional services (70% systems integration, 20% systems consulting, and 10% education and training) provided to the federal government.

LCS provides professional services to the federal government in the areas of space systems, logisitics systems, and engineering services.

- Areas of expertise include systems engineering, analysis, and integration; systems modeling and simulation; command and control; feasibility studies; management information systems; and the development of real-time systems.

- LCS is the prime contractor for the U.S. Air Force Reliability and Maintainability Information System (REMIS).

  - This systems integration project will provide the Air Force the ability to retrieve reliability and maintainability logistics data on a worldwide basis. REMIS will support more than 2,000 users thoughout the major command, air logistics centers, and technology repair centers.

  - The system consists of five geographically distributed Tandem VLX computers and hundreds of terminals.

  - The current value of this 10-year program is $115 million.

- Under a $85 million contract with the Royal Saudi Air Force (RSAF) LCS developed an integrated logistics management system for fielded weapon systems.

  - This system provides separate real-time data bases for project monitoring/management, maintenance management/control, and supply and inventory control/management; a centralized data base, with a distributed secure network; an individual weapon system orientation; high weapon systems, subsystems, and components visibility; and configuration status/accountability management.

  - LCS has provided system definition, facility construction, hardware selection and installation, all software development, training, and operation and maintenance of the completed system.

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- For over two decades LCS has provided continuing support to U.S. military and space programs in the areas of systems design, development, and software engineering.

  - Since 1965, LCS has served as the real-time data systems software development contractor to the U.S. Air Force Satellite Control Facility. In this role LCS has developed software for orbit support, satellite command and control, telemetry evaluation, and communications. Software support provided by LCS includes analysis; design; coding; configuration management; specification development; integration, test, and evaluation; verification and validation; program maintenance; documentation and library maintenance; and management and consulting.

- LCS continues to provide behavior research and development of training methodologies for the U.S. Army.

LCS provides processing services to over 600 clients from data centers in Reston (VA), Lexington (MA), and Woodland Hills (CA).

- LCS offers dedicated machine environments, and general financial, data base, and utility processing services as well as access to the following applications:

  - Medical Eligibility Database
  - Litton Common Information System (LCIS)
  - Accounts Payable System
  - Customer Information System
  - Distribution Transaction Data Base System
  - Facilities Management System
  - FICS Budget Entry System
  - Financial & Consolidation System
  - Fixed Asset Control System
  - Hazardous Material Reference System
  - Ledger System

- LCS' processing customers come from a range of industries.

Industry Markets

LCS' professional services revenue is derived primarily from defense agencies of the federal government. Noncaptive processing services revenue is derived from a range of industries.

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A breakdown of LCS' source of noncaptive revenue for fiscal 1988 is estimated by INPUT as follows:

Federal government	30%
Software developers	22%
Banking and finance	20%
Insurance	10%
Manufacturing	6%
Transportation	3%
Medical	3%
State/local government	3%
Services	3%
	100%

Geographic Markets

Approximately 96% of LCS' fiscal 1988 revenue was derived from the U.S. and 4% from Saudi Arabia.

LCS has offices in Mountain View, Woodland Hills, and San Diego (CA), Reston (VA), Boston (MA), New York (NY), Dayton (OH), Columbus (GA), Colorado Springs (CO), Montgomery (AL), Lexington (MA), Washington, D.C., and Saudi Arabia.

Computer Hardware and Software

LCS has the following mainframes installed at its data centers in Reston, Lexington, and Woodland Hills:

- 1 IBM 3090-400E, MVS/XA, ESA
- 1 IBM 3084, MVS/XA
- 1 IBM 3083B, MVS/DOS/VSE, MVS/SP, VM/CMS
- 1 NAS XL/70, MVS/XA
- 1 NAS XL/70, MVS/SP
- 1 NAS 9080, MVS/SP

Clients access LCS data centers via the Litton Data Network.

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NATIONAL DATA CORPORATION
National Data Plaza
Atlanta, GA 30329
(404) 728-2000

L.C. Whitney, Chairman and CEO
Public Corporation, OTC
Total Employees: 4,300
Total Revenue, Fiscal Year End
5/31/89: $227,496,000

The Company

National Data Corporation (NDC) was incorporated in 1967 in Delaware to provide specialized data processing and facilities management services. The company currently provides various processing services, professional services, turnkey systems, and facilities management primarily in the areas of cash management, credit card authorization and processing, health care, and telemarketing.

Total fiscal 1989 revenue reached $227.5 million a 28% increase over fiscal 1988 revenue of $177.1 million. Net income rose approximately 23%, from $16.4 million in fiscal 1988 to 20.2 million in fiscal 1989. A five-year financial summary follows:

NATIONAL DATA CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	5/89	5/88	5/87	5/86	5/85
Revenue	$227,496	$177,137	$158,816	$142,823	$123,211
• Percent increase from previous year	28%	12%	11%	16%	6%
Income before taxes	$31,485	$25,670	$24,287	$19,180	$9,218
• Percent increase (decrease) from previous year	23%	6%	27%	108%	(57%)
Net income	$20,238	$16,429	$13,565	$6,758	$7,542
• Percent increase (decrease) from previous years	23%	21%	101%	(10%)	(38%)
Earnings per share	$1.75	$1.43	$1.20	$0.61	$0.68
• Percent increase (decrease) from previous year	22%	19%	97%	(10%)	(34%)

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Recent acquisitions made by NDC include the following:

- In 1989, NDC acquired Condor Corporation, an Alabama-based supplier of pharmacy automation systems. Condor had approximately 45 employees at the time of the acquisition.

- In February 1989, NDC acquired TeleCARD[R], the electronic data capture business of Telenet Communications Corporation, a subsidiary of U.S. Sprint Corporation.

  - The acquisition of TeleCARD adds 5,000 credit card authorization terminals to NDC's existing base of 75,000 terminals.

- Also in February 1989, NDC acquired Modular Data, Inc. of Los Angeles. Modular Data provides electronic data capture of retail credit and debit card transactions for banks, and now operates as a wholly-owned subsidiary of NDC.

- In July 1989, NDC entered into an agreement with First Pennsylvania Bank, N.A., whereby NDC will acquire First Pennsylvania's merchant processing business. NDC will perform all merchant accounting, authorization, data capture, customer service, credit and support functions. First Pennsylvania will continue to accept merchant deposits at its branches.

- During 1988, NDC entered into an identical agreement with Chemical Bank, a former competitor. Chemical Bank had approximately 20,000 merchant processing customers with point-of-sale equipment in approximately 25,000 customer locations.

NDC is organized into the following divisions/subsidiaries:

- The NDC Credit Card Services Division provides credit card charge authorization, credit card processing, and remittance processing services.

- The NDC Corporate Financial Services Division provides various cash management and reporting processing services.

- The NDC Health Care Data Services Division provides turnkey systems for pharmacy applications. Through NDC Federal Systems, Inc. the company also provides professional services to federal government agencies for health care applications.

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- The NDC Telemarketing Services Division provides direct sales and response telemarketing services, market analysis, and locater services to retailers and operator services to the telecommunications industry.

- Communication Response Services, Inc. is a wholly-owned subsidiary providing telemarketing services.

- NDC International, Ltd., a wholly-owned subsidiary headquartered in London, markets cash management services throughout Western Europe.

- National Data Corporation of Canada, Ltd. markets cash management, credit card, and telemarketing services in Canada. This subsidiary is headquartered in Don Mills, Ontario.

- Technology Sales and Leasing Co., Inc. is an equipment leasing subsidiary.

- Modular Data, Inc. is a wholly-owned subsidiary providing electronic data capture primarily in California.

NDC's principal competitors, by service area, include the following:

- Cash management: Automatic Data Processing and in-house data processing centers.

- Credit card services: First Data Resources and various bank associations.

- Telemarketing: Dial America and regional telephone answering firms.

- Health care: Three PM Inc. (3PM) and PharmAssist.

Key Products and Services

INPUT estimates approximately 88% of NDC's total fiscal 1989 revenue was derived from its various processing services, 9% from turnkey systems sales, and 3% from the sale of application software packages.

- Services for fiscal 1988 were segmented as follows ($ millions):

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	Revenue	Percent of Total
Electronic payment systems	$75.1	42%
Corporate financial services	$37.8	21%
Health care data services	$32.5	18%
Telecommunications services	$31.8	18%
TOTAL	$177.1*	100% *

** Difference in total due to rounding*

Although the 1989 revenue results by service area are not available at the time of publication, INPUT believes the services mix did not change substantially in fiscal 1989.

- The telecommunications services revenue for fiscal 1990 should decrease as a percent of revenue in fiscal 1990 due to the loss of a major contract with U.S. Sprint. U.S. Sprint indicated it would be handling its operator services in-house as of the fourth quarter of fiscal 1989 or the first quarter of fiscal 1990. The U.S. Sprint contract contributed 70% to telecommunications services revenue in fiscal 1988 and 11% to NDC's total revenue.

Electronic payment systems include credit card charge authorization, credit and debit card processing, and remittance processing for both bank and private label card plans.

- NDC's credit card authorization services are presently being provided to approximately 1 million locations through approximately 200 financial institutions in the U.S. and Canada. The credit card authorization services are being used by approximately 600,000 retail outlets.
  - NDC's electronic point-of-sale authorization systems provide banks and merchants with a nationwide credit authorization network for both credit cards and checks. Credit requests are transmitted from the merchant to NDC through the merchant's terminal, and the credit authorization is then relayed to the terminal by electronic display or audio response.
    - The service is also capable of supporting additional applications such as NDC's deposit and information reporting services and other cash management services.

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    - Approximately 150,000 merchants through 200 financial institutions use NDC's electronic point-of-sale authorization systems.

  - Credit authorization is also provided by telephone, voice and audio response authorization services.

    - NDC maintains seven regional voice centers that are staffed 24 hours a day, seven days a week.

    - Audio response authorization employs computer-synthesized voice response to credit inquiries.

- The Total System™ is an on-line credit card authorization and billing system jointly offered by NDC and a Columbus Bank and Trust company affiliate, Total Systems Services, Inc.

  - Total Systems Services, Inc. provides the credit card billing and merchant accounting portion of the service, and NDC provides the authorization and data entry components.

  - The system can process both MasterCard and VISA credits for the same customer.

  - NDC receives a percent of revenue from this venture as commission.

  - A total of 175 banks, credit unions, and savings and loan associations currently use the system.

- Remittance processing services provided by NDC include depositing payments to a customer-designated account and providing same-day accounts receivable updates and summary reports. There are approximately 35 customers using this service.

- In September 1983, NDC introduced the Electronic Data Capture (EDC) system, which incorporates the capabilities of an electronic point-of-sale terminal to verify credit, and offers merchants positive balancing at the point of sale, prior to depositing.

  - The system operates in conjunction with NDC's Network for Electronic Transaction Services (NETS™). A terminal is used to process the transaction for authorization and store the cardholder information for transmission to NDC where the data is collected, balanced, and switched electronically to

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the merchant bank for deposit and subsequently to the cardholder's bank for billing.

- The system also provides for the storage and retrieval of sales tickets and daily activity reporting by store location.

- There are approximately 65,000 merchant locations currently using the EDC system.

- During fiscal 1986, NDC introduced a host-based data capture capability to its EDC system. This system differs from the NDC terminal-based system in that it can be accessed by first generation ("dumb") dial terminals as well as on-line point-of-sale devices such as electronic cash registers and customer/clerk-operated line control terminals. The system is currently processing both credit and debit card transactions. In 1987, NDC completed implementation of the system for a major retailer and now has over 2,000 electronic cash registers on-line.

- NDC also offers industry-specific EDC systems for the restaurant industry and the lodging industry.

Corporate Financial Services, available to banks and their corporate customers, include the following:

- NDC's Deposit Reporting Service permits electronic concentration of local bank deposits from an organization's remote locations into central banks for accelerated funds availability.

  - Deposit reports are compiled and transmitted to the concentration bank designated by the customer for the purpose of initiating funds transfer via depository transfer checks (DTCs) or electronic Automated Clearing House debits.

  - The same data is also transmitted to customer management. This service accelerates the availability of cash receipts, enforces systematic unit reporting, provides audit trails for reconciliation, and provides confidential handling.

  - Approximately 4,200 customers presently use this service and about 175 market this service to their customers.

- Bank Balance Reporting Services enable customers of participating banks to receive daily bank balance information so that cash management decisions can be made rapidly.

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Approximately 2,000 banks participate in this service, involving in excess of 10,000 corporate customers.

- NDC's Money Transfer System allows corporate customers to initiate wire transfers through banks by terminals located at the customers' places of business. Instructions are forwarded by terminal to the sending bank for immediate processing. Twenty-seven banks currently subscribe to this service.

- The Information Reporting Service provides customers with daily or other periodic consolidated management information collected from remote locations, such as data on sales, payroll, disbursements, inventory, and deposits. Approximately 430 customers currently use this service.

- NDC also offers Foreign Exchange Reporting as a complement to its international cash management services.

  - The service provides immediate and current exchange rate information for various foreign currencies in addition to spot rate information, future rate prediction, and comparative rate analysis of foreign exchange deposits and transactions.

  - Eighteen bank customers currently subscribe to Foreign Exchange Reporting, involving in excess of 260 customers.

- The Cash Management Exchange™ is a cash management, financial, and reporting service that provides for the transmission and exchange of information and instructions, both to and from banks, their corporate customers, and other computers via NDC's on-line network.

  - Financial and transactional data available via the Cash Management Exchange includes multibank balance and account activity, depository transfer information, foreign exchange and money market rates, and securities transaction reporting.

  - The Cash Management Exchange receives financial information from more than 2,000 banks in 46 countries and provides financial information to some 10,000 corporations. Approximately 130 banks currently subscribe to the service.

- NDC offers NETS™ (Network for Electronic Transactions) primarily to bank customers. NETS is a distributed processing network based on Tandem NonStop computers that allows banks to provide advanced financial services to large corporations and the middle, retail, and consumer (personal

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computer) markets by linking microcomputers and terminals with NDC's network. Approximately 5,300 corporations are using the NETS system through 13 licensee banks.

- In early 1983, NDC introduced the Treasury Manager System, an IBM PC-based decision support system for treasury functions that can also be used to access NDC's Cash Management Exchange network.

  - Software modules are available to assist the corporate treasurer in determining net cash positions, analyzing debt and investment levels, forecasting cash, and providing cash ledger and general ledger data.

  - NDC provides marketing support, training, installation, customer service, and maintenance for the system.

  - Prices range from $8,000 to $20,000 for the average hardware and software configuration, plus ongoing usage fees. Existing IBM PC users can also license the software separately

- NDC provides timesharing through an arrangement with GE Information Services in connection with some of its cash management services. The timesharing capability, which is also offered through NDC's own network, allows each customer to store data and obtain reports that meet their specifications.

- The Cash Management Academy™ was established by NDC in 1982 to offer instruction to corporate and banking clients in the area of cash management theory and techniques.

NDC's Health Care Data Services Division provides turnkey systems for pharmacy management to hospitals, health maintenance organizations (HMOs), and independent and chain store pharmacies.

- DataStat™, introduced in 1983, is a turnkey system designed for pharmacy management running on both minicomputers and personal computers.

  - NDC's initial DataStat product was designed for the retail pharmacy. Versions for nursing homes and hospitals are also available.

  - DataStat fills, refills, and prices prescriptions; maintains patient profiles; processes third-party claims; and prepares management reports. A communications interface allows

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access to NDC's network for price updating, data base updating, and third-party billing functions.

- NDC also provides a complete microcomputer-based automated management system for dental offices. The system manages and maintains patient information, an appointment calendar, insurance claims processing and follow-up tracking, patient treatment planning and tracking, and customer billing and receivable tracking.

- DataLink™, for large drugstore chains, is a payment systems interface between DataStat and NDC's credit card authorization and check guarantee network. A cash management interface allows the pharmacy system to use NDC's cash reporting and financial services.

- In June 1988, NDC entered into an agreement with Paid Prescriptions, Inc. under which NDC will provide Paid Prescriptions with certain electronic services relating to Paid Prescriptions' pre-paid prescription drug programs, and Paid Prescriptions will market electronic processing services to its pharmacy customers on behalf of NDC.

- NDC Federal Systems, Inc. (FSI), formed with the acquisition of Libra Group in 1984, provides professional services for health care applications. Services are provided primarily to federal government agencies.

  - Services include:

    - Requirements analysis
    - Facilities planning
    - Site engineering
    - Systems design, including distributed systems and data base management systems
    - Hardware and/or software selection, procurement, and installation
    - Facilities management

  - FSI also provides electronic eligibility verification, real-time claims authorization, data capture and adjudication services to a variety of health care markets such as hospitals, health maintenance organizations, pharmacies and preferred provider organizations. This service enables the company's customer to speed up claims collection and reconciliation while eliminating paper processing by sending the claims electronically to NDC, which in turn processes them and transmits them to payers.

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Telemarketing Services are provided to retailers and advertisers who market their products by television and newsprint advertising, direct response mail, and catalogs to the "shop at home" buyer. A broad range of services are available 24 hours a day, seven days a week.

- In connection with its Inbound Telemarketing System, NDC operators answer the phone in the client's name, take the order, enter the order in a central data base, and provide the client with a complete order record at the end of each day. NDC can prepare and deliver orders using the client's own order and report forms, and can provide credit card authorization for the caller at the time the order is placed.

- During fiscal 1984, NDC expanded its telemarketing services to include direct telephone sales (Outbound Telemarketing System) on behalf of its clients. A major user of these services is AT&T.

- Merchandiser Marketing and Market Analysis Services provide the client with information on television advertising effectiveness. Associated consulting services are also available.

- Locater Services direct the telephone caller to the nearest location for a specific product or service.

- Other services include:

  - Operator services for major telecommunications suppliers, including collect call processing, call completion from older rotary telephones, directory assistance, and person-to-person calling capabilities

  - Consulting and fund-raising programs

Industry Markets

A majority of NDC's fiscal 1989 revenue was derived from the banking and finance and retail industry sectors. The remainder of revenue was derived from petroleum, medical, airlines, and telephone industry clients and the federal government.

Geographic Markets

Approximately 96% of NDC's fiscal 1989 revenue was derived from the U.S. The remaining 4% was derived from Canada, Japan, and Europe.

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PAYCHEX, INC.
911 Panorama Trail South
Rochester, NY 14625-0397
(716) 385-6666

B. Thomas Golisano, Chairman, President, and CEO
Public Corporation, OTC
Total Employees: 1,800
Total Revenue, Fiscal Year End 5/31/89: $101,153,834

The Company

Paychex, founded in 1979, provides batch payroll processing services to over 105,000 small businesses nationwide. The company also offers employee fringe benefit products, personnel management services, and automatic tax payment services to its processing clients in certain geographic markets.

Paychex' fiscal 1989 revenue reached $101.2 million, a 27% increase over fiscal 1988 revenue of $79.4 million. Net income rose 36%, from $6.9 million in fiscal 1988 to over $9.4 million in fiscal 1989. A five-year financial summary follows:

PAYCHEX, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	5/89	5/88	5/87	5/86	5/85
Revenue	$101,154	$79,433	$63,891	$50,704	$40,930
• Percent increase from previous year	27%	24%	26%	24%	29%
Income before taxes	$14,974	$11,230	$10,247	$7,774	$4,770
• Percent increase from previous year	33%	10%	32%	63%	9%
Net income	$9,446	$6,935	$5,124	$4,170	$2,982
• Percent increase from previous year	36%	35%	23%	40%	47%
Earnings per share (a)	$0.73	$0.54	$0.40	$0.33	$0.23
• Percent increase from previous year	35%	35%	21%	43%	44%

(a) Restated to reflect a 3-for-2 stock split effected in the form of a 50% stock dividend on November 13, 1987.

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Paychex management attributes the company's consistent growth to the continued expansion of its customer base, which increased 21% during fiscal 1989.

- To a lesser extent, revenue also increased during fiscal 1989 as a result of a 53-week billing period in 1989 versus 52 weeks in 1988 and 1987.
- Selective price increases in May 1988 and September 1987 also contributed to revenue increases.
- A five-year summary of the company's number of clients, processing centers, and employees follows:

	FISCAL YEAR				
ITEM	5/89	5/88	5/87	5/86	5/85
Number of clients	105,600	87,300	70,200	56,900	46,300
Processing centers	68	64	60	54	48
Paychex employees	1,800	1,500	1,300	1,030	950

Approximately 80% of the businesses that were Paychex clients in fiscal 1988 continued to be clients in fiscal 1989.

Paychex currently has 1,835 employees, including 1,616 full-time and 219 part-time, segmented as follows:

Sales representatives	329
Payroll specialists	620
Officers/managers	180
Other	706
	1,835

Paychex's major competitor is Automatic Data Processing, Inc. Paychex also competes with banks and smaller independent companies.

Key Products and Services

Virtually 100% of Paychex's fiscal 1989 was derived from batch payroll and associated processing services. Revenues from the company's fringe benefit, personnel, and tax payment services were minimal during fiscal 1989.

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Paychex markets its services primarily to small businesses employing fewer than 100 persons.

- Once a business becomes a Paychex client, Paychex personnel convert the client's payroll records to a Paychex computer. Thereafter the client, with one telephone call to a Paychex branch office each payroll period, reports the payroll hours per employee and any personnel or compensation changes.

- Every pay period Paychex prepares payroll checks with employee earnings statements, payroll journals, departmental earnings and deduction summaries, client timesheets, and payroll deduction registers (as required).

- Every deposit period Paychex provides written notification of all required federal, state, and local payroll tax deposits, including the tax deposit amount and due date.

- Four times a year Paychex prepares for each client the following: Form 941 (Employer's Quarterly Federal Tax Return); state unemployment insurance returns; tax deposits for federal unemployment insurance (Coupon 8190); any required local tax returns and deposits; employee earnings histories; quarterly report of wages; and year-to-date report of wages.

- At year end, Paychex prepares the following forms--balanced, reconciled, and ready to file: employer and employee W-2 forms; W-3 recap of federal taxes withheld; recap of state and local taxes withheld; 940 Federal Unemployment Insurance Return; and supporting information for the year's payroll.

- Delivery is provided by mail, courier, or customer pick-up.

- The fees for Paychex's payroll services are calculated by pay period, with the total fee directly proportional to the number of employees. Fees generally range from $0.80 to $2.50 per employee per pay period.

Paychex also offers the following products and services to its payroll processing clients:

- Fringe Benefit Services, introduced during fiscal 1986, include a core group of products for health insurance, workers' compensation, group life, and group dental insurance. The products are issued by several insurance companies through Paychex, as agent or broker, on a nonexclusive basis. These

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products are currently available through 13 Paychex branch offices.

- Personnel Services, introduced during fiscal 1989, are designed to help small employers deal with legal and personnel issues that revolve around their employees, including the preparation of employee handbooks, compliance information regarding the workplace, and equal employment rules and regulations. These services were initially offered in upstate New York and have been expanded to all Paychex offices in New York State and California.

- The Tax Payment Service, introduced during fiscal 1989, is an option available to processing clients. When preparing payroll for a client, Paychex will extract from the client's bank account the accrued tax liability for that period, including all state and federal, unemployment, disability, and local taxes. Paychex maintains those dollars in a fiduciary account, and, upon the specific due dates, make the payments for the client to the appropriate tax jurisdiction.

  - For this service, Paychex receives additional processing revenue and interest income from the fiduciary account. The Tax Payment Service option can add in excess of 30% more revenue for Paychex per client per year.

  - The service is currently available in four cities. Expansion to other branches is planned during fiscal 1990.

- Paychex also provides its customers with a series of specialized publications relating to payroll and payroll tax information. These publications are provided free of charge.

Industry Markets

Virtually all of Paychex's revenue is derived from businesses with fewer than 100 employees.

Clients include restaurants, retailers, franchisees, attorneys, accountants, doctors, dentists, and various other small businesses.

Geographic Markets

One hundred percent of Paychex's fiscal 1989 revenue was derived from the U.S.

Paychex has 68 payroll processing centers and 14 sales offices in 33 states and the District of Columbia.

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- During fiscal 1989, Paychex opened processing centers in Toledo (OH), Calumet City (IL), Oklahoma City (OK), and El Monte (CA).

- The company plans to open a minimum of five new processing centers during fiscal 1990.

Computer Hardware

Paychex's processing centers generally have Prime 4050, 2755, or 2655 computers installed.

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SHARED MEDICAL SYSTEMS CORPORATION
51 Valley Stream Parkway
Malvern, PA 19355
(215) 296-6300

R. James Macaleer, Chairman and CEO
Graham King, President
Public Corporation, OTC
Total Employees: 3,860
Total Revenue, Fiscal Year End
12/31/88: $378,738,000

The Company

Shared Medical Systems Corporation (SMS) was formed in 1969 to provide information services to the hospital industry. In June 1976, SMS became a publicly held corporation.

SMS is currently the nation's leading provider of information services to the health care industry.

- The company's products and services are provided to hospitals, clinics, and physician groups for financial, administrative, and clinical management applications.

- SMS currently provides remote computing, network, and distributed processing services; application software products; turnkey systems; and various professional services, including proprietary network design, custom programming, systems installation, education, and facilities management.

Revenue for 1988 was $378.7 million, a 3% decrease from 1987 revenue of $390.7 million. Net income declined 35%, from $45.3 million in 1987 to $29.4 million in 1988. A five-year financial summary follows:

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SHARED MEDICAL SYSTEMS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$378,738	$390,730	$374,880	$312,207	$256,753
• Percent increase (decrease) from previous year	(3%)	4%	20%	22%	22%
Income before taxes	$44,952	$75,529	$55,300	$74,332	$62,637
• Percent increase (decrease) from previous year	(40%)	37%	(26%)	19%	22%
Net income	$29,398	$45,318	$31,968	$41,748	$33,756
• Percent increase (decrease) from previous year	(35%)	42%	(23%)	24%	24%
Earnings per share	$1.25	$1.80	$1.26	$1.66	$1.37
• Percent increase (decrease) from previous year	(31%)	43%	(24%)	21%	23%

SMS management attributes the company's slowed growth and net income declines to the following:

- 1988 revenue declines were attributed primarily to weaker sales and renewal activity during 1987 and a portion of 1988. In addition, a higher percentage of new contracts were fixed-price contracts (producing revenues on a monthly basis over several years), rather than perpetual license agreements (which generate large one-time license fees during the approximately twelve-month period following a sale).

- Expenses were approximately $333.8 million (88% of revenue) in 1988, compared to $315.2 million (81% of revenue) in 1987. The increase in expenses was attributed primarily to increased personnel costs and equipment-related costs to service the business. General and administrative expenses for 1988 include a charge of $2.5 million in anticipation of payment for the settlement of a class action suit filed against SMS and certain officers.

- The small revenue growth (4%) in 1987 was attributed to selling-related problems.

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- In 1986, income before taxes and net income were adversely affected by the equity in losses and write-down of the company's investment in SMS International N.V. (SMSI) and the related shutdown expenses of SMSI's Japanese subsidiary.

  - SMSI, which operated as a 45%-owned affiliate of SMS during 1985, was established by SMS in 1981 to provide services--directly and through subsidiaries, joint ventures, and license arrangements--to health care organizations outside North America. Effective June 30, 1986, SMS acquired 100% ownership of SMSI.

  - The activities described above resulted in additional expenses during 1986 of approximately $30.2 million, reducing overall earnings by approximately $20 million.

Research and development expenditures were approximately $37.5 million (10% of revenue) in 1988, $37.9 million (10% of revenue) in 1987, and $34.4 million (9% of revenue) in 1986. During 1988, 1987, and 1986 the company also capitalized approximately $13.5 million, $8.7 million, and $3.1 million, respectively, for certain software development costs.

SMS is currently organized into seven divisions and two subsidiaries as follows:

- The Hospital Systems Division, SMS' largest business unit, provides network and distributed processing services, application software, and associated hardware to domestic, nonfederal hospitals.

- The Decision Support Division, formed in 1988, markets a family of integrated DEC-based decision support products and provides consulting services.

- The Laboratory Products Division, formed in early 1988, is dedicated specifically to the development, marketing, delivery, and support of hospital clinical laboratory information systems.

- The Radiology Systems Division, formed in 1988, provides DEC-based systems to the hospital radiology information systems market.

- The Turnkey Systems Division, formed in late 1987, is dedicated exclusively to the development, marketing, installation, and support of DEC-based turnkey hospital information systems. The division's current product line consists of the ALLEGRA™ system.

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- The Physicians' Services Division provides processing, facilities management, turnkey systems, and practice management and consulting services to physician group clients.

- The Federal Systems Division, formed in 1988, markets SMS' products and services to hospitals operated by the federal government.

- SMS International N.V. markets SMS products and services outside North America.

- SMS Canada provides SMS products and services in Canada.

Major competitors of SMS include the following:

- Processing competitors include Systems Associates, Inc. (First Data Resources/American Express) and various regional firms.

- Competition from vendors providing in-house systems comes from IBM, HBO & Company, and Baxter Healthcare Corporation.

- Physicians' services competitors include Cycare and IDX.

Key Products and Services

INPUT estimates approximately 70% of SMS' 1988 revenue was derived from remote and facilities management processing services, 25% from software and hardware leases from in-house/distributed processing and turnkey systems, and the remaining 5% from professional services.

SMS' products and services are provided to hospitals, clinics, and physician groups.

- The company's primary market is acute-care hospitals, generally with 100 or more beds, and physician groups.

- SMS currently serves more than 1,200 hospitals and physician group practices.

- There are over 1,000 mainframes and minicomputers running SMS software installed at SMS client locations.

SMS provides over 100 applications to its hospital, clinic, and physician group clients for financial, administrative, and clinical management. A summary of applications provided by SMS is shown in the exhibit.

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EXHIBIT

SMS APPLICATIONS

APPLICATION AREA	APPLICATION AREA
Financial Management • Inpatient Billing • Advanced Outpatient • Physicians Billing • General Ledger and Statistics • Risk Management • Planning • Marketing Support • Payroll • Time and Attendance • Personnel • Human Resources • On-line Account Management • On-line Cost Accounting Management • On-line Materials Management • Inventory Control • Accounts Payable • Accounts Receivable • Property Accounting Management • Ambulatory Information System • Financial Patient Index • Master Patient Index **Administration** • Administration, Planning, and Statistics • Census • Comparative Statistics • Discharge Planning • Infection Control • Medical Records • Professional Services • Quality Assurance • Risk Management • Tumor Registry • Utilization Review • DRG Management • Drug Utilization Review • Marketing • Mortality Rate Analysis **Decision Support** • Trend Monitor • Cost Accounting Manager • Performance Manager • Flexible Budget Monitor • INFOSTATION	**Clinical Management** • Admissions • Care Planning • Chart Location and Delinquency • Clinic Scheduling • Inpatient Registration • Laboratory: Blood Bank, Chemistry, Anatomic Pathology, Microbiology • Order Processing • Results Reporting • Outpatient Registration • Nurse Staffing • Patient Care Plans • Patient Identification • Resource Scheduling • Pharmacy • Radiology • Reregistration • Dietary • Remote Physician Access **Physicians' Systems** • Architecture • Decision Control • Patient Management • Guarantor/Patient Billing • Insurance Processing • Accounts Receivable • Physician Production Analysis • Advanced Collection Workstation • Medical Records Chart Tracking • Clinical Patient Profiles • Ad Hoc Reporting • Appointment Scheduling **Other** • HARMONY • Development Office System • Computer-Aided Instruction • Professional Staff Credentialing

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New/enhanced applications introduced during 1988 include the following:

- The Decision Support Division released SMS' Decision Support System (DSS), a family of integrated DEC-based software applications, data bases, and consulting services for health care executives and managers.

  - DSS integrates clinical and financial information drawn from SMS applications, other hospital systems, and external data bases.

  - DSS applications address revenue management, costs, utilization, quality of care, and operational activities--such as HMO/PPO contracting, productivity analysis, and monitoring physician treatment profiles. DSS products include capabilities for forecasting and simulation, pricing analysis, and product line management and planning.

- A new version of SMS' Nursing application automates and integrates care plan and patient classification activities.

- During 1988, SMS began hospital-based tests of various bedside technologies, including stationary and handheld devices, in order to evaluate their effectiveness as part of nursing applications.

- The latest version of SMS' Radiology Management System, when integrated with a SMS hospital information system, supports patient scheduling, registration, tracking, results reporting, film tracking, and equipment maintenance scheduling. The system uses barcode technology to access films and reports. An electronic voice synthesizer facilitates remote inquiry into the results reporting system. Imaging capabilities are under development.

- SMS' Laboratory System now provides applications dedicated to chemistry, microbiology, anatomic pathology, and blood bank activities. SMS is pursuing a new segment of the clinical marketplace--multi-entity labs. During 1988, SMS' new Laboratory System was installed at a central lab that serves five affiliated hospitals.

- A new version of the SMS Pharmacy System provides inpatient and outpatient support of hospital pharmacy functions, including full medication and IV support of outpatients, expanded inventory control capabilities, and an enhanced clinical inquiry capability.

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SMS currently provides remote computing, distributed processing, and in-house systems to its hospital clients.

- The Information Systems Center processes data for more than 800 hospital and physician group clients using IBM 3090 computers. There are currently more than 30,000 terminals attached to the network that connect clients with the Information Systems Center.

- INDEPENDENCE ™, an IBM-based financial and clinical management system targeted to large hospitals, is available as a remote computing service and as an in-house system for IBM 43XX and 30XX computers.

  - INDEPENDENCE Inhouse Computing Option (ICO) is targeted to large hospitals that require an in-house system.

  - SMS' INDEPENDENCE Remote Computing Option (RCO) allows hospitals to run their financial and clinical applications at SMS' Information Systems Center on dedicated computers.

  - Over 100 clients have INDEPENDENCE installed as an in-house system, and approximately 45 hospitals are using the Remote Computing Option.

- ALLEGRA® is an integrated DEC VAX-based health care information system targeted primarily to community hospitals with 100 to 400 beds. The system supports clinical, financial, administrative, and decision support applications. There are currently 50 ALLEGRA clients.

- EXACT® is a distributed system with clinical applications processed on in-hospital DEC or IBM computers, and financial applications processed remotely at the SMS Information Systems Center.

- SMS' current DEC VAX-based Laboratory System, marketed and supported by the Laboratory Products Division, includes Anatomic Pathology and Blood Bank applications, and a MicroVAX-based on-line instrument interface capability. The system can serve any single hospital or multi-entity environment and can be delivered as part of an integrated hospital system or on a standalone basis.

- Professional services provided to hospitals include client site facilities management, education, custom programming, proprietary network design, system installation, and consulting.

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- During 1988, the Decision Support Division provided programming and analysis projects for clients, and research assignments for third parties, including government agencies.

- SMS has announced the following agreements:

  - In April 1988 SMS announced a research and development agreement with CliniCom and Scripps Memorial Hospitals, Inc. of La Jolla (CA). The agreement will link the CliniCom handheld terminal to the SMS Patient Management and Pharmacy Systems to quantify the clinician's needs for information at the bedside.

  - In March 1988 SMS and Atwork Corporation of Chapel Hill (NC) announced they are jointly marketing three microcomputer-based nurse management information systems developed by Atwork and designed for integration into SMS' health care information systems.

    - The three systems include the Automated Nurse Staffing Office System, the Operating Room Scheduling Office System, and the Recruitment Manager.

SMS services over 400 medical practices representing over 10,000 physicians nationwide. The company provides the following products and services to physician groups:

- SIGNATURE[R] consists of interrelated physician applications and subsystems designed to provide financial, clinical, and administrative information processing support for medical groups of all sizes.

  - SIGNATURE is an on-line, interactive system. Basic application modules include Architecture, Decision Control, Patient Management, Guarantor/Patient Billing, Insurance Processing, Accounts Receivable Management, and Physician Production Analysis.

  - Optional applications available include Advanced Collection Workstation, Medical Records Chart Tracking, Clinical Patient Profiles, AD HOC Reporting, and Appointment Scheduling.

  - SIGNATURE is available as an in-house or as a remote computing option. All configurations operate using IBM and compatible computers under MVS.

  - There are currently over 100 SIGNATURE clients.

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- The Physicians Office System (POS) is an in-house microcomputer-based office management system targeted to small physician practices of up to five physicians.
  - POS includes all functions related to patient registration, charge and payment entry, patient and insurance billing, receivables management and reporting, and patient charting. Other modules are available to access and interact with data in the system's data base.
  - POS can be used to access SMS mainframe hospital systems to preadmit patients, order tests, view admission/discharge/transfer (ADT) data, and obtain lab results.
- SMS continues to support, but no longer actively markets, the MED-GROUP, PBS, and PBS2000 products.

SMS' local-area network product, HARMONY, facilitates communications within medical complexes and among affiliated institutions in the same geographic area.

Industry Markets

Virtually 100% of SMS' 1988 revenue was derived from the medical industry. Acute-care hospitals accounted for the majority, with the remainder from physician group practices and clinics.

SMS currently has one federal-funded hospital client, the Philadelphia Veterans' Hospital.

Geographic Markets

The majority of SMS' 1988 revenue was derived from the U.S. INPUT estimates less than 5% was derived from international locations.

SMS currently has contracts with hospitals in 47 states, the District of Columbia, and Puerto Rico. The company also has hospital contracts in Canada, the U.K., Ireland, The Netherlands, West Germany, and Spain.

U.S. branch offices are located in Ann Arbor (MI); Atlanta (GA); Boston (MA); Charlotte (NC); Chicago (IL); Cleveland and Columbus (OH); Dallas (TX); Denver (CO); Indianapolis (IN); Kansas City (KS); Los Angeles, Oakland, San Francisco, and Santa Barbara (CA); Miami (FL); Milwaukee (WI); Nashville (TN); New Orleans (LA); New York (NY); Philadelphia and

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Pittsburgh (PA); Phoenix (AZ); Seattle (WA); Somerset (NJ); St. Louis (MO); Washington, D.C.; and Wilmington (DE). The company also has an office in San Juan (PR).

International offices are located in Canada (2), Germany, Ireland, Spain, The Netherlands, and the U.K.

Computer Hardware

SMS has the following computers installed at its data center in Malvern (PA):

- 2 IBM 3090-600Es
- 1 IBM 3090-400E
- 1 IBM 3084-Q64 (made up of two IBM 3081s)

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SYSTEMATICS, INC.
4001 Rodney Parham Road
Little Rock, AR 72212
(501) 223-5100

John E. Steuri, Chairman and CEO
Public Corporation, OTC
Total Employees: 2,571
Total Revenue, Fiscal Year End
5/31/89: $206,786,000

The Company

Systematics, Inc., founded in 1968, provides facilities management and disaster recovery processing services, application software products, consulting and training professional services, and turnkey systems to the banking and finance industry.

Until 1981, Systematics operated as an unconsolidated, majority-owned (75%) subsidiary of Stephens Inc., an investment banking firm also located in Little Rock. Subsequent to public offerings of Systematic's common stock made in fiscal 1982 and 1983, Stephens Inc. currently owns 48.7% of the outstanding shares.

- Systematics derived approximately $5.1 million, $5.2 million, and $5.3 million in fiscal 1987, 1986, and 1985, respectively, from processing services provided to affiliates of Stephens.

In January 1986, Systematics acquired Matrix Management, Inc., a Dallas-based management consulting firm specializing in the financial services industry, for 17,263 shares of Systematics common stock.

Also in January 1986, Systematics acquired Chanin Consulting Services (CCS) of New York City (NY). CCS markets a securities lending support software product to large trust departments.

Fiscal 1989 revenue reached $206.8 million, an increase of 13% over fiscal 1988 revenue of $179.5 million. Net income increased 18%, from $15.4 million in fiscal 1988 to $18.9 million in fiscal 1989. A five-year financial summary follows:

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SYSTEMATICS, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	5/89	5/88	5/87	5/86	5/85
Revenue	$206,786	$179,474	$141,577	$122,599	$95,875
• Percent increase from previous year	15%	26%	15%	28%	22%
Income before taxes	$30,216	$24,882	$19,538	$18,726	$15,390
• Percent increase from previous year	21%	27%	4%	22%	50%
Net income	$18,864	$15,424	$10,162	$11,363	$8,645
• Percent increase (decrease) from previous year	22%	52%	(11%)	31%	43%
Earnings per share	$1.68	$1.39	$0.93	$1.03	$0.79
• Percent increase (decrease) from previous year	21%	49%	(10%)	30%	41%

Systematics management attributes the company's revenue growth over the past three years primarily to new processing agreements, scheduled price increases under existing contracts, increases in software licensing, and increased sales of data processing equipment.

- For fiscal 1989, new data processing agreements accounted for 84% of the year's increase in revenue, while software licensing and maintenance accounted for only 16% of the increase in revenue for the year.

Product development and support expenditures increased 8%, from $16.6 million in 1988 to $17.9 million in 1989. Education and training expenses increased from $3.6 million in 1988 to $3.9 million in 1989.

Systematics has pledged to spend $75 million on research and development over the next 5 years.

Systematics is organized as follows:

- FM East is responsible for facilities management contracts for the eastern U.S.

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- FM West is responsible for facilities management contracts for the western U.S.
- Software Service Marketing is responsible for marketing applications software products.
- Technical Services is responsible for the development, maintenance, and customer support of all Systematics' software.
- Human Resources provides education and training to employees and customers.
- Finance and Law handles the internal financial and legal operations of the company.
- Systematics Consulting Services, formerly Matrix Management, Inc., provides consulting services.
- The International Division markets and supports application products for customers located outside the U.S.
- The Community Banks Division markets turnkey systems to smaller banks and thrifts.

Systematics' major competitors include the following companies: EDS, FIserv, Hogan Systems, and First Financial Management.

Key Products and Services

Approximately 76% of Systematics' fiscal 1989 revenue was derived from processing services (facilities management), 11% from application software products, 4% from consulting professional services, and 9% from equipment sales and leases.

Systematics' products and services are designed exclusively for the financial industry (banks, savings institutions, credit unions, and mortgage service companies).

Systematics had 72 facilities management contracts in effect at the end of fiscal 1989, an increase of 9 contracts over fiscal 1988, and 22 over fiscal 1987's 50 active contracts.

- Facilities management contracts are generally marketed to larger banks, those with deposits ranging from $250 million to $10 billion or more.
  - The computer hardware and data center staff are located in or near the bank.

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- Such contracts usually have a term of five years and include a 99-year nonexclusive license for the client to use the software for internal processing.

- The company provides facilities management processing services from over 60 company-owned data centers.

A remote services contract, generally five years in length, is used for the company's smaller bank clients. Systematics derived approximately 4% of its fiscal 1989 revenue from services contracts, compared with 10% of revenue in fiscal 1986.

- Remote services clients may elect to purchase a non-exclusive license to continue use of Systematics' software following the original term of the remote services contract.

- Because processing is done at remote locations that service several clients, it tends to be less customized.

- Three of the company's data centers are devoted to serving the 56 currently active remote services contracts.

Systematics has developed a complete set of integrated banking and financial applications software termed Systematics Integrated Financial Software. These applications, available through facilities management/services contracts and as software products, include the following:

- On-Line Delivery Systems:

  - The Back Office
  - The Platform
  - The Branch
  - The ATM

- Accounting Systems:

  - Demand Deposits

    - Integrated Monetary Processing and Control System (IMPACS)
    - Savings/Time Deposit

  - Loans

    - Commercial Loans
    - Installment Credit
    - Real Estate Loans

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- Auxiliary Accounting Systems

  - Combined Statements
  - All Items Entry Control
  - Item Reconciliation
  - Tax Reporting
  - Warehouse
  - Dealer Floor Plan
  - Dealer Reserve
  - Charge-Off
  - Loan Origination
  - Collections

- Management Systems:

  - Financial Management Systems

    - Financial Management Systems (FMS)
    - Accounts Payable
    - Asset/Liability Management System (ALMS)

  - Customer Management Systems

    - Customer Information System (CIF)
    - Profitability Analysis
    - Combined Statements

  - Information Management Systems

    - Systematics Information Management System (SIMS)
    - SMART Marketing System

Systematics also provides disaster backup and recovery services, contingency planning, and consulting services. Customers, primarily financial institutions, may subscribe to either a shell facility or a fully-equipped IBM facility, generally for a term of five years.

- Disaster backup services are marketed only to Systematics contract clients.

Systematics software products run on IBM mainframes under DOS/VSE, VM, and MVS.

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- All of the applications available through Systematics' FM processing services may be purchased as individual software products or as a total integrated system.

- There are currently about 150 clients who have purchased the software for in-house use.

Turnkey systems available from Systematics include the following:

- In fiscal 1989, Systematics introduced the Systematics Automated Financial Environment (SAFE), a reworked version of Systematics' Community Banking System, designed to run on IBM's AS/400 minicomputer. There are currently four installations of the SAFE product.

- The Community Bank System, introduced in January 1987, is an IBM System 36-based multi-bank, multi-branch system for community banks with $50 million to $200 million in deposits.

  - The central information system supports the following applications:

    - Proof of Deposit
    - Demand Deposit
    - Savings, Christmas Club, CDs, and IRAs
    - Installment and Commercial Loans
    - General Ledger
    - Automated Clearing House
    - Account Reconciliation
    - Safe Deposit Box Accounting
    - Shareholder Accounting
    - ATMs
    - Report Generator
    - Word Processor
    - Asset/Liability Management System

  - Systematics is no longer actively marketing the System 36-based products. Systematics is attempting to move the Community Bank System's existing eight clients to SAFE.

- In June 1983, Systematics became a value-added remarketer for IBM personal computers and introduced its first microcomputer software package, ALMS™ (Asset Liability Management System).

  - ALMS provides monthly, quarterly, and long-range planning for financial management.

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- ALMS is available as a software product or as a turnkey system. Modules include the following:

  - Balance Sheet Organization
  - Monthly Budget Simulation, Gap Analysis, and management reporting
  - Bond Swap Analysis
  - Futures Hedging and Trading

Systematics' Career Development Center, located in Little Rock, provides training support for its software products to employees and clients.

- Courses are offered in the principles of banking, effective supervision, management, basic and advanced programming, systems design and architecture, and in-depth studies of individual Systematics' applications.

- During fiscal 1989, 3,817 people attended 271 Center classes, including 1,960 client participants.

- Systematics spent nearly $4 million on Center operations, not including the costs of salaries for those attending classes.

Industry Markets

One hundred percent of Systematics' fiscal 1989 revenue was derived from the banking and finance industry, including commercial banks, thrifts, mortgage banks, and other financial institutions.

- The majority of revenue is derived from commercial banks with deposits over $250 million.

Geographic Markets

Systematics derived approximately 95% of its fiscal 1989 revenue from the U.S.

- Systematics began marketing its services internationally in 1987 and derived approximately 5% of its fiscal 1989 revenue from customers located in Europe, Asia, the Pacific, South America and Canada.

  - Systematics has a regional office in Singapore, handling sales and support for the Pacific Rim.

  - Sales of Systematics software in the Scandanavian countries are handled by Computas, located in Oslow, Norway.

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A

Appendix: Definitions

Appendix: Definitions

Information Services - Computer/telecommunication-related services involving one or more of the following:

- Processing of computer/telecommunication-based applications using vendor computers (called "processing services")
- Network-oriented services or functions such as value-added networks, electronic mail, electronic document interchange, on-line data bases, news data bases, videotex
- Products and services that assist users in performing functions on their own computers or vendor computers (called "software products" or "professional services")
- Services that utilize a combination of hardware and software, integrated into a total system (called "turnkey systems" and/or "systems integration")

A

User Expenditures

All user expenditures reported are "available" (i.e., noncaptive, as defined below).

Noncaptive Information Services User Expenditures - Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user

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Captive Information Services User Expenditures—Expenditures received from users who are part of the same parent corporation as the vendor.

B
Delivery Modes

1. Processing Services

This category includes transaction processing, utility processing, other processing services, and systems operations.

- *Transaction Processing Services* - Updates client-owned data files by entry of specific business activity, such as sales order, inventory receipt, cash disbursement, etc. Transactions may be entered in one of four modes.

  - *Interactive* - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.

  - *Remote Batch* - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.

  - *User Site Hardware Services (USHS)* - Those offerings provided by processing services vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

    - Access to a communications network

    - Access through the network to the vendor's larger computers

    - Local management and storage of a data base subset that will service local users via the connection of a data base processor to the network.

    - Significant software as part of the service

  - *Carry-in Batch* - Where users deliver work to a processing services vendor

- *Utility Processing* - Vendor provides access to basic software tools, enabling the users to develop and operate their own problem solutions such as language compilers, assemblers, DBMS, sorts, scientific library routines, and other systems software.

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- *"Other" Processing Services* - Include computer output microfilm, laser printing, CD-service preparations, other data output services, scanning and other data entry services, disaster recovery and backup services.

- *Systems Operations (Processing)* - Also referred to as "resource management," facilities management, or "COCO" (contractor-owned, contractor-operated). Systems operations is the management of all or part of a user's data processing functions under a long-term contract of not less than one year. To qualify, the contractor must directly plan, control, operate, and own the facility provided to the user—either on-site, through communications lines, or in a mixed mode. The computer systems/networks used are vendor-owned and operated.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Examples of industry-specialty applications are seismic data processing, numerically controlled machine tool software, and demand deposit accounting.

2. Network Services

Network services include a wide variety of network-based functions and operations. Their common thread is that none of these functions could be performed without network involvement. Network services is divided into two major segments: network applications and electronic information systems.

a. Network Applications

The network applications segment is composed of four subsets:

- *Value-Added Networks (VANs)* - VANs typically involve common carrier network transmission facilities that are augmented with computerized switched. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching

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techniques. However, other added data service features, such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing, are of equal importance.

- *Electronic Data Interchange (EDI)* - EDI is the application-to-application electronic communications between organizations, based on established business document standards.

- *Electronic Information Interchange (Electronic Mail—E-Mail)* - Transmission of messages across an electronic mail network managed by a services vendor. This can also include bulletin board services.

- *Other Network Services* - This segment contains videotex and network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. Network management services included here must involve the vendor's network and network management computers as well as people. People-only functions are included in professional services.

b. Electronic Information Services

Electronic information services are data bases that provide specific terminal-based inquiry such as stock prices, legal precedents, economic indicators, medical diagnosis, airline schedules, current news stories, automobile valuations, etc. Users typically inquire into and extract information from these data bases but do not update them.

The terminals may be computers themselves, such as communications servers or personal computers. The two kinds of electronic information services are:

- Data Bases - structured, primarily numerical data on company financial instruments, products, materials, etc.

- News - unstructured, primarily textual information on people, companies events, etc.

3. Software Products

This category includes user purchases of applications and systems software packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for

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work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

There are several subcategories of software products, as indicated below.

a. Applications Software Products

Applications software products perform functions directly related to solving user's business or organizational need. The products can be:

- *Cross-Industry Products* - Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.

- *Industry-Specific Products* - Used only in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, material resource planning, and insurance claim management.

b. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

- *System Control Products* - Function during applications program execution to manage the computer system's resources. Examples include operating systems, communication monitors, emulators, spoolers, network control, library control, windowing, access control.

- *Data Center Management Products* - Used by operations personnel to manage the computer system's resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, utilities, capacity management.

- *Applications Development Products* - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include traditional programming languages, 4GLs, sorts, productivity aids, assemblers, compilers, data dictionaries, data base management systems, report writers, project control and CASE systems.

4. Turnkey Systems

A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single application (or set of applications) solution. The value added by the vendor is primarily

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in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems may be either custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included the appropriate software category.

- Turnkey systems revenue is divided into two categories.

  - *Industry-Specific Systems* - Systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical recordkeeping, or discrete manufacturing control systems

  - *Cross-Industry Systems* - Systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems

- Revenue includes hardware, software, and support functions.

5. Systems Integration (SI)

Systems integration is a business offering that provides a complete solution to a complex information system, networking or automation requirement through the custom selection and implementation of a variety of information products and services.

A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function and performance on schedule and at the contracted price.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed system design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, cutover, test, and evaluation
- Life cycle support, including:
  - System documentation and user training

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- Systems operations during development
- Systems maintenance

- Financing

6. Professional Services

This category includes consulting, education and training, software development, and systems operations as defined below.

- *Software Development* - Development of a software system on a custom basis. It includes one or more of the following: user requirements definition, system design, contract programming, documentation.

- *Education and Training* - Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

- *Consulting Services* - Information systems and/or services management consulting, project assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Systems Operations (Professional Services)* - This is a counterpart to systems operations (processing services) except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's systems.

C
Equipment/Computer Systems

1. Equipment

Equipment includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor and generally cannot be included in other categories such as terminals

- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters

- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters

- *Communication Devices* - Includes modems, encryption equipment, special interfaces, and error control

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- *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories

- *Terminals* - Three types of terminals are described below:

  - *User Programmable* - Also called intelligent terminals, including:

    - Single-station or standalone
    - Multistation shared processor
    - Teleprinter
    - Remote batch

  - *User Nonprogrammable*

    - Single-station
    - Multistation shared processor
    - Teleprinter

  - *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

2. Computer Systems

Computer systems include all processors from microcomputers to supercomputers. Computer systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices.

- *Microcomputer [personal computer] (Price below $15,000)* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in the form of:

  - Integrated circuit package
  - Plug-in board with more memory and peripheral circuits
  - Console including keyboard and interfacing connectors
  - Personal computer with at least one external storage device directly addressable by the CPU

- *Workstation (Price between $10,000 and $100,000)* - An integrated multifunctional workstation capable of routine higher-speed communications with mini and mainframe computers and of performing complex local processing. While similar to microcomputers, the workstation typically has high performance 16- or 32-bit architectures, plus greater graphics and integrated communications capabilities.

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- *Minicomputer (Price between $15,000 and $350,000)* - Usually a 16- or 32-bit computer. May represent a portion of a larger system or a complete standalone system by itself.

  - Small business computer
  - Small laboratory computer
  - Nodal computer in a distributed data network, remote data collection network, or connected network, or connected to remote microcomputers

- *Mainframe (Price above $350,000)* - Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

- *Supercomputer* - High-powered processors with numerical processing throughout that is significantly greater than the fastest general-purpose computers, with capacities in the vicinity of 10-50 million floating point operations per second (MFLOPS). Supercomputers fit in one of two categories:

  - *Real Time* - Generally used for signal processing in military applications.

  - *Non-Real Time* - For scientific use in one of three configurations:

    - Parallel processors
    - Pipeline processor
    - Vector processor

- *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a device such as an automobile, machine tool, weapon, weapon system, or platform; limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems.

D
Telecommunications

1. Networks

Networks are the electronic interconnections between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

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- *Common Carrier Network* - A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud

- *Value-Added Network (VAN)* - (See listing under Section B.2, Delivery Modes.)

- *Local-Area Network (LAN)* - Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods.

  - *Baseband* - Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.

  - *Broadband* - Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

    - Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing)

    - Multiple (time-sequenced) channels via TDM (Time Division Multiplexing)

    - High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media)

2. Transmission Facilities

Transmission facilities include wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes, depending on the vendor and the distribution of the network.

- *Mode* - may be either:

  - *Analog* - Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems

  - *Digital* - Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form

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- *Media* - May be any of the following:

  - *Wire* - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full- duplex balanced lines

  - *Carrier* - A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity

  - *Coaxial Cable* - A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance

  - *Microwave* - UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission; also capable of wide frequency channels

  - *Optical Fiber* - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications

  - *Communications Satellites* - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation

  - *Cellular Radio* - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

E

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user's viewpoint. Expenditures are then categorized according to what users perceive they are buying.

The standard industrial classification (SIC) codes are used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation.

The specific industries (and their SIC codes) included under these generic industry sectors are detailed in the exhibit.

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EXHIBIT A-1

Industry Sector Definitions

Industry Sector	Industry SIC	Industry Name
Discrete Manufacturing	23	Apparel
	25	Furniture
	27	Printing
	31	Leather
	34	Metal
	35	Machinery
	36	Electronics
	37	Transportation
	38	Scientific and control instruments
	39	Miscellaneous
Process Manufacturing	10	Metal mining
	11	Anthracite mining
	12	Coal mining
	13	Oil and gas extraction
	14	Mining/quarrying of nonmetallic minerals, except fuels
	20	Food products
	21	Tobacco
	22	Textile products
	24	Lumber and wood products
	26	Paper products
	28	Chemicals
	29	Petroleum
	30	Rubber and plastics
	32	Stone, glass, clay
	33	Primary metals
Transportation	40	Railroads
	41	Local transit
	42	Motor freight
	43	U.S. Postal Service
	44	Water transportation
	45	Air transportation
	46	Pipelines
	47	Transportation services

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EXHIBIT A-1 (Cont.)

Industry Sector Definitions (Cont.)

Industry Sector	Industry SIC	Industry Name
Utilities	49	Electric, gas, and sanitary
Telecommunications	48	Communications
Wholesale Distribution	50	Durable goods
	51	Nondurable goods
Retail Distribution	52	Building materials, hardware
	53	General merchandise
	54	Food
	55	Automotive and gas stations
	56	Apparel
	57	Furniture
	58	Eating and drinking
	59	Miscellaneous retail
Banking and Finance	60	Banks
	61	Credit agencies
	62	Security and commodity brokers
	67	Holding and investment offices
Insurance	63	Insurance (life, health, etc.)
	64	Insurance agents
Medical	80	Health services
Education	82	Educational services

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EXHIBIT A-1 (Cont.)

Industry Sector Definitions (Cont.)

Industry Sector	Industry SIC	Industry Name
Services	72	Personal services
	73	Business services (excluding information services companies themselves)
	89	Miscellaneous services
	66	Combinations of real estate, insurance, loans, law offices
	81	Legal services
	76	Miscellaneous repair
Federal Government	N/A	As appropriate
State and Local Government	N/A	As appropriate
Other Industries	01-09	Agriculture, forestry, and fishing
	15-17	Construction
	70	Hotels, rooming houses, camps, and other lodging places
	75	Automotive repair, services, and garages
	78	Motion pictures
	79	Amusement and recreation services, except motion pictures
	83	Social services
	84	Museums, art galleries, botanical and zoological gardens
	86	Membership organizations

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B

Appendix: Market Forecast Data Base, 1989-1994

Market Forecast Data Base

EXHIBIT B-1

Processing Services User Expenditure Forecast by Industry Sector, 1989-1994 ($ Millions)

Delivery Mode	1988	Growth 88-89 (%)	1989	1990	1991	1992	1993	1994	CAGR 89-94 (%)
Total Processing Services	18,125	12	20,325	22,265	25,339	28,347	31,845	35,836	12
Discrete Manufacturing	805	8	865	530	1,010	1,060	1,180	1,290	8
Process Manufacturing	810	25	1,015	1,120	1,235	1,370	1,515	1,685	11
Transportation	1,560	12	1,750	1,994	2,272	2,588	2,950	3,361	14
Utilities	90	11	100	110	121	134	149	165	11
Telecommunications	560	17	656	755	869	1,000	1,151	1,324	15
Wholesale Distribution	330	8	356	395	438	487	543	605	11
Retail Distribution	135	14	154	172	192	215	242	272	12
Banking & Finance	3,790	16	4,395	5,008	5,709	6,508	7,420	8,462	14
Insurance	825	13	929	1,096	1,296	1,536	1,823	2,170	18
Medical	975	9	1,110	1,227	1,361	1,510	1,685	1,880	8
Education	230	3	238	253	270	288	307	328	7
Services	680	13	770	825	885	949	1,018	1,093	7
Federal Government	460	9	499	542	591	649	717	797	10
State & Local Government	740	13	839	1,006	1,210	1,456	1,756	2,121	20
Other Industry Sector	595	10	655	723	799	883	976	1,080	11
Total Industry Sectors	12,585	14	14,330	15,756	18,258	20,636	23,432	26,633	13
Cross-Industry Sector									
Accounting	990	4	1,030	1,060	1,092	1,125	1,159	1,194	3
Education & Training	90	3	93	95	96	98	100	102	2
Engineering & Scientific	115	3	118	123	128	133	139	144	4
Human Resources	1,195	21	1,360	1,525	1,710	1,910	2,135	2,395	12
Office Systems	40	-2	39	38	36	35	33	32	-4
Planning & Analysis	220	-2	216	205	195	185	176	167	-5
Other Cross-Industry Sector	430	14	490	529	572	618	667	720	8
Total Cross-Industry Sectors	3,080	9	3,346	3,575	3,829	4,104	4,409	4,754	7
Miscellaneous									
Utility Processing Services	900	-5	855	906	961	1,018	1,079	1,144	6
Other Processing Services	1,560	15	1,794	2,027	2,291	2,589	2,925	3,305	13
Total Miscellaneous	2,460	8	2,649	2,934	3,251	3,607	4,004	4,450	11

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EXHIBIT B-2

Transaction Processing Services User Expenditure Forecast by Industry Sector, 1989-1994 ($ Millions)

Delivery Mode	1988	Growth 88-89 (%)	1989	1990	1991	1992	1993	1994	CAGR 89-94 (%)
Total Transaction Processing Services	12,030	11	13,347	14,630	16,062	17,656	19,433	21,439	10
Discrete Manufacturing	705	6	750	795	845	895	945	1,005	6
Process Manufacturing	610	5	640	680	720	765	810	860	6
Transportation	1,520	12	1,702	1,941	2,212	2,522	2,875	3,278	14
Utilities	60	10	66	71	77	83	90	97	8
Telecommunications	525	16	609	700	805	926	1,065	1,225	15
Retail Distribution	120	15	138	152	167	184	202	222	10
Wholesale Distribution	270	7	289	315	343	374	408	445	9
Banking & Finance	2,590	15	2,979	3,366	3,803	4,298	4,856	5,488	13
Insurance	280	12	314	345	379	417	459	505	10
Medical	425	6	476	500	525	551	579	608	5
Education	160	3	165	173	182	191	200	210	5
Services	670	13	757	810	867	927	992	1,062	7
Federal Government	245	2	250	250	250	250	250	250	0
State & Local Government	190	20	228	255	286	320	359	402	12
Other Industry Sector	580	10	638	702	772	849	934	1,028	10
Total Industry Sectors	8,950	12	10,001	11,055	12,233	13,552	15,024	16,685	11
Cross-Industry Sector									
Accounting	990	4	1,030	1,060	1,092	1,125	1,159	1,194	3
Education & Training	90	3	93	95	96	98	100	102	2
Engineering & Scientific	115	3	118	123	128	133	139	144	4
Human Resources	1,195	14	1,360	1,525	1,710	1,910	2,135	2,395	12
Office Systems	40	-2	39	38	36	35	33	32	-4
Planning & Analysis	220	-2	216	205	195	185	176	167	-5
Other Cross-Industry Sector	430	14	490	529	572	618	667	720	8
Total Cross-Industry Sectors	3,080	9	3,346	3,575	3,829	4,104	4,409	4,754	7

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EXHIBIT B-3

Systems Operations Processing Services User Expenditure Forecast by Industry Sector, 1989-1994 ($ Millions)

Delivery Mode	1988	Growth 88-89 (%)	1989	1990	1991	1992	1993	1994	CAGR 89-94 (%)
Total Systems Operations	3,635	19	4,333	5,105	6,023	7,113	8,408	9,946	18
Discrete Manufacturing	100	14	114	137	164	197	236	284	20
Process Manufacturing	200	89	377	442	517	604	707	827	17
Transportation	40	18	47	53	59	66	74	83	12
Utilities	30	12	34	39	44	51	59	68	15
Telecommunications	35	35	47	55	64	74	86	99	16
Wholesale Distribution	60	12	67	80	95	113	135	160	19
Retail Distribution	15	8	16	20	25	32	40	49	25
Banking & Finance	1,200	18	1,416	1,643	1,905	2,210	2,564	2,974	16
Insurance	545	13	616	751	917	1,118	1,364	1,664	22
Medical	550	15	635	725	835	960	1,105	1,270	15
Education	70	4	73	80	88	97	107	117	10
Services	10	25	13	15	18	22	26	31	19
Federal Government	215	16	249	292	341	399	467	547	17
State & Local Government	550	11	611	751	924	1,136	1,397	1,719	23
Other Industry Sector	15	15	17	22	27	34	42	53	26

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C

Appendix: Data Base Reconciliation

C

Appendix: Data Base Reconciliation

A

Processing Services Market

The overall processing services market was $18,125 million in 1988. This is approximately 4% or $727 million less than the $18,852 million INPUT forecast in the 1988 processing services report. The key differences are smaller estimates of the size of the industry-specific transaction processing market (reduced by 5% or $452 million) and the utility processing market (reduced by 22% or $259 million). Changes in the overall market are outlined in Exhibit C-1.

The overall growth rate of the market during the 1988-1993 time frame is still estimated to be 12%. However, the lowered base in 1988 means that the market size in 1993 will be approximately $1 billion less than forecast last year.

Though the overall processing services growth rate remains essentially unchanged—as does the growth rate for industry-specific processing—there has been a significant shift in the way industry-specific processing will be performed by 1993. The market for systems operations services has grown faster that INPUT projected in last year's report, and this growth is anticipated to accelerate over the next five years. Therefore, INPUT has raised its estimate of the market growth rate from 14% per year to 18% between now and 1993. This will increase the estimated size of the 1993 systems operations market by nearly $1.5 billion over last year's forecast.

One reason for this is a move away from traditional short-term transaction processing contracts to long-term contracts, which are defined as systems operations. Accompanying this is a shift away from ad hoc processing services—the processing of one or two applications on a relatively nonintegrated, standalone basis—and toward more integrated processing of a firm's entire suite of applications. This shift requires the kind of long-term commitment which is the basis of the systems operations business.

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EXHIBIT C-1

Overall Processing Services Delivery Mode

Delivery Mode	1988 Market				1993 Market				88-93 CAGR	
	1988 Report (Fcst.) ($M)	1989 Report (Actual) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	1988 Report (Fcst.) ($M)	1989 Report (Fcst.) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	88 Rpt. (%)	89 Rpt. (%)
Processing Services Total	18,852	18,125	(727)	-4	32,855	31,846	(1,009)	-3	12	12
Industry-Specific Sectors	12,965	12,585	(380)	-3	23,742	23,433	(309)	-1	13	13
- Transaction Processing	9,402	8,950	(452)	-5	16,811	15,024	(1,787)	-11	12	11
- Systems Operations	3,563	3,635	72	2	6,931	8,409	1,478	21	14	18
Cross-Industry Sectors	3,082	3,080	(2)	0	4,606	4,409	(197)	-4	8	7
- Transaction Processing	3,082	3,080	(2)	0	4,606	4,409	(197)	-4	8	7
Miscellaneous Applications	2,805	2,460	(345)	-12	4,507	4,004	(503)	-11	10	10
- Utility Processing	1,159	900	(259)	-22	1,324	1,079	(245)	-19	3	4
- Other Processing	1,567	1,560	(7)	0	3,087	2,925	(162)	-5	15	13
- Syst. Operations (X-ind)	79	-	*	*	96	-	*	*	4	*
Transaction Processing	12,484	12,030	(454)	-4	21,417	19,433	(1,984)	-9	11	10
- Industry-Specific	9,402	8,950	(452)	-5	16,811	15,024	(1,787)	-11	12	11
- Cross-Industry	3,082	3,080	(2)	0	4,606	4,409	(197)	-4	8	7
Systems Operations	3,642	3,635	(7)	0	7,027	8,409	1,382	20	14	18
- Industry-Specific	3,563	3,635	72	2	6,931	8,409	1,478	21	14	18
- Cross-Industry	79	-	*	*	96	-	*	*	4	*

* Not applicable

Exhibit C-2 presents the changes is this year's forecast on an industry-by-industry basis for the overall processing services market.

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EXHIBIT C-2

Overall Processing Services Delivery Mode by Industry Sector

Industry/Sector	1988 Market				1993 Market				88-93 CAGR	
	1988 Report (Fcst.) ($M)	1989 Report (Actual) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	1988 Report (Fcst.) ($M)	1989 Report (Fcst.) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	88 Rpt. (%)	89 Rpt. (%)
Processing Services Total	18,852	18,125	(727)	-4	32,855	31,846	(1 009)	-3	12	12
Industry Sectors										
Discrete Manufacturing	753	805	52	7	1,340	1,181	(159)	-12	12	8
Process Manufacturing	1,017	810	(207)	-20	1,862	1,517	(345)	-19	13	13
Transportation	1,558	1,560	2	0	3,027	2,949	(78)	-3	14	14
Utilities	85	90	5	6	148	149	1	1	12	11
Telecommunications	559	560	1	0	1,137	1,151	14	1	15	15
Wholesale Distribution	125	180	55	44	231	337	106	46	13	13
Retail Distribution	331	285	(46)	-14	519	448	(71)	-14	9	9
Banking and Finance	3,788	3,790	2	0	7,327	7,420	93	1	14	14
Insurance	823	825	2	0	1,566	1,823	257	16	14	17
Medical	1,032	975	(57)	-6	1,877	1,684	(193)	-10	13	12
Education	237	230	(7)	-3	293	307	14	5	4	6
Services	678	680	2	0	954	1,018	64	7	7	8
Federal Government	650	460	(190)	-29	905	717	(188)	-21	7	9
State & Local Government	734	740	6	1	1,547	1,756	209	14	16	19
Other Industries	595	595	0	0	1,009	976	(33)	-3	11	10
Total Industry Sectors	12,965	12,585	(380)	-3	23,742	23,433	(309)	-1	13	13
Cross-Industry Sectors										
Accounting	991	990	(1)	0	1,151	1,159	8	1	3	3
Education and Training	91	90	(1)	-1	110	100	(10)	-9	4	2
Engineering and Scientific	115	115	0	0	140	139	(1)	-1	4	4
Human Resources	1,195	1,195	0	0	2,121	2,135	14	1	12	12
Office Systems	42	40	(2)	-5	34	33	(1)	-3	-4	-4
Planning and Analysis	217	220	3	1	177	176	(1)	-1	-4	-4
Other Cross-Industry	431	430	(1)	0	873	667	(206)	-24	15	9
Total Cross-Industry	3,082	3,080	(2)	0	4,606	4,409	(197)	-4	8	7
Miscellaneous Applications										
Utility Processing Services	1,159	900	(259)	-22	1,324	1,079	(245)	-19	3	4
Other Processing Services	1,567	1,560	(7)	0	3,087	2,925	(162)	-5	15	13
Systems Operations	79	-	*	*	96	-	*	*	4	*
Total Miscellaneous	2,805	2,460	(345)	-12	4,507	4,004	(503)	-11	10	10

* Not applicable

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B

Transaction Processing Market

Exhibit C-3 summarizes the 1988 and 1989 report forecasts for transaction processing services. There have been few changes in the estimates of the 1988 market size from last year's report. The primary difference involved a reduction of $346 million in the process manufacturing sector. This is offset by an increase of $160 million in systems operations for this sector—an example of the delivery mode shift mentioned above.

The medical sector 1988 transaction processing market estimate was reduced by $50 million, as this market showed virtually no growth from 1987 to 1988. The turmoil in this market is expected to continue for the next several years. Therefore, INPUT has also reduced the growth estimate from 11% to 5% CAGR over the next five years.

Federal government spending cuts by the Department of Energy and NASA reduced the transaction processing market by $90 million from last year's forecast. Continuing budgetary problems and Gramm-Rudman constraints, together with the declining threat of the cold war, are expected to persist over the next five years. Since much of the demand for federal processing services is associated with space, defense and related budgets, and much of this market is shifting to long-term systems operations contracts, INPUT now forecasts flat growth in this area—down from the 6% CAGR predicted last year.

Discrete manufacturing is another area in which the transaction processing growth rate estimates have been scaled back (12% in last year's report versus 6% in this year's)—in part due to a shift away from ad hoc processing to longer-term, integrated systems operations contracts.

In the cross-industry markets, the residual "other cross-industry" segment also shows a reduction of estimated growth rates, from 15% to 9%, as small-scale ad hoc transaction processing services are displaced by small turnkey systems or applications software running on microcomputers.

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EXHIBIT C-3

Transaction Processing Delivery Mode by Industry Sector

Industry/Sector	1988 Market				1993 Market				88-93 CAGR	
	1988 Report (Fcst.) ($M)	1989 Report (Actual) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	1988 Report (Fcst.) ($M)	1989 Report (Fcst.) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	88 Rpt. (%)	89 Rpt. (%)
Transaction Processing Total	12,484	12,030	(454)	-4	21,417	19,433	(1,984)	-9	11	10
Industry Sectors										
Discrete Manufacturing	680	705	25	4	1,206	945	(261)	-22	12	6
Process Manufacturing	956	610	(346)	-36	1,773	810	(963)	-54	13	6
Transportation	1,518	1,520	2	0	2,943	2,875	(68)	-2	14	14
Utilities	56	60	4	7	91	90	(1)	-1	10	8
Telecommunication	525	525	0	0	1,063	1,065	2	0	15	15
Wholesale Distribution	121	120	(1)	-1	224	202	(22)	-10	13	11
Retail Distribution	273	270	(3)	-1	422	408	(14)	-3	9	9
Banking and Finance	2,586	2,590	4	0	4,797	4,856	59	1	13	10
Insurance	277	280	3	1	514	459	(55)	-11	13	13
Medical	476	425	(51)	-11	807	579	(228)	-28	11	6
Education	164	160	(4)	-2	201	200	(1)	0	4	5
Services	668	670	2	0	941	992	51	5	7	8
Federal Government	335	245	(90)	-27	450	250	(200)	-44	6	0
State & Local Government	187	190	3	2	396	359	(37)	-9	16	14
Other Industries	580	580	0	0	983	934	(49)	-5	11	10
Total Industry Sectors	9,402	8,950	(452)	-5	16,811	15,024	(1,787)	-11	12	11
Cross-Industry Sectors										
Accounting	991	990	(1)	0	1,151	1,159	8	1	3	3
Education and Training	91	90	(1)	-1	110	100	(10)	-9	4	2
Engineering and Scientific	115	115	0	0	140	139	(1)	-1	4	4
Human Resources	1,195	1,195	0	0	2,121	2,135	14	1	12	12
Office Systems	42	40	(2)	-5	34	33	(1)	-3	-4	-4
Planning and Analysis	217	220	3	1	177	176	(1)	-1	-4	-4
Other Cross-Industry	431	430	(1)	0	873	667	(206)	-24	15	9
Total Cross-Industry	3,082	3,080	(2)	0	4,606	4,409	(197)	-4	8	7

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C

Systems Operations Market

Exhibit C-4 summarizes the 1988 and 1989 report forecasts for systems operations. Other than the process and discrete manufacturing areas mentioned above, there have been few changes in the estimates of the 1988 market size from last year's report. However, many of the growth rates have been adjusted upward as a result of the projected increase in demand for long-term outsourcing of operations. Overall, the estimated five-year growth rate of systems operations has been increased from 14% to 18% CAGR, and the size of the forecast 1993 market has been raised by nearly $1.4 billion.

EXHIBIT C-4

Systems Operations Delivery Mode by Industry Sector

Industry/Sector	1988 Market				1993 Market				88-93 CAGR	
	1988 Report (Fcst.) ($M)	1989 Report (Actual) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	1988 Report (Fcst.) ($M)	1989 Report (Fcst.) ($M)	Variance from 1988 Report ($M)	Variance from 1988 Report (%)	88 Rpt. (%)	89 Rpt. (%)
Systems Operations Total	3,642	3,635	(7)	0	7,027	8,409	1,382	20	14	18
Industry Sectors										
Discrete Manufacturing	73	100	27	37	134	236	102	76	13	19
Process Manufacturing	61	200	139	228	89	707	618	694	8	29
Transportation	40	40	0	0	84	74	(10)	-12	16	13
Utilities	29	30	1	3	57	59	2	4	14	14
Telecommunication	34	35	1	3	74	86	12	16	17	20
Wholesale Distribution	4	60	56	1,400	7	135	128	1,829	12	18
Retail Distribution	58	15	(43)	-74	97	40	(57)	-59	11	22
Banking and Finance	1,202	1,200	(2)	0	2,530	2,564	34	1	16	16
Insurance	546	545	(1)	0	1,052	1,364	312	30	14	20
Medical	556	550	(6)	-1	1,070	1,105	35	3	14	15
Education	73	70	(3)	-4	92	107	15	16	5	9
Services	10	10	0	0	13	26	13	100	5	21
Federal Government	315	215	(100)	-32	455	467	12	3	8	17
State & Local Government	547	550	3	1	1,151	1,397	246	21	16	20
Other Industries	15	15	0	0	26	42	16	62	12	23
Total Industry Sectors	3,563	3,635	72	2	6,931	8,409	1,478	21	14	18
Miscellaneous Applications Systems Operations (Cross-Industry)	79	-	*	*	96	-	*	*	4	*

* Not applicable

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Federal government spending in 1988 for systems operations was reduced for the same reasons as the spending reductions in the transaction processing area. However, the five-year growth rate has been increased from 8% to 17%, reflecting the shift away from transaction processing into longer-term contracts.

A similar shift in process manufacturing has already been mentioned: the 1988 market size estimate has been increased from $60 million to $200 million, and the five-year growth rate increased from 8% to 29%.

The wholesale and retail distribution sector forecasts have been changed significantly. There has been a marked growth spurt in the wholesale distribution arena, as EDI capabilities allow firms to tighten their control of inventories and increase the demand for sophisticated order processing systems. The 1988 market estimate for wholesale systems operations has been raised from $4 million to $60 million, and the five-year growth rate from 12% to 18%.

At the same time, the 1988 retail distribution market estimate has been reduced from $58 million to $15 million. The recent LBOs in this market have created significant price competition and cost pressures, and the industry's bankruptcies and consolidations have reduced the demand for systems operations. Generally slower growth in the U.S. economy will also have a dampening effect on this sector. While the five-year growth rate has been increased from 11% in last year's report to 22% this year, this is really a statistical effect of the significant decrease in the 1988 base year estimate. This year's forecast of the 1993 market is $40 million—a reduction of more than 50% in last year's estimate of $97 million for the 1993 market.

Other industries showing significant increases in the forecast five-year growth rate for systems operations are:

Industry	Previous Estimate	Current Estimate
Insurance	14%	20%
Education	5%	9%
Services	8%	17%
State & Local Government	16%	20%
Other Industries	12%	23%

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